American Foundryman

1941

TIVITIES

February
1941

National Defense and Apprentice Training

SEVERAL weeks ago, six men, outstanding in the field of labor management, met at dinner in New York to discuss industry's greatest needs. It was the unanimous opinion of these men that the most pressing problem today is the training of men. This bears out the opinion expressed in an article by Robert Gross, president, Lockheed Aircraft Corp., Burbank, Calif., who wrote that "we have to go out and **manufacture men** to manufacture material."

Many others, in view of the National Defense Program, evidently are thinking along the same lines, because two of the questions which have been asked me most frequently during the past few months have been:

1. What is the defense program going to do to apprenticeship?
2. Is there any need for starting a new apprenticeship program or even continuing our present program when this emergency training program is giving us good men at short notice?

Industry is much like the army. When an army expands, there is no dearth of privates. The first shortage is experienced in officers and sergeants, unless provision has been made to train individuals for those duties before the expansion. Furthermore, the backbone of the army is the trained privates who know the arts of war.

So it is with industry. The keymen in industry must be trained men who know the products and operations used in manufacture. In our National Defense industries today, many of the key men were apprentices just a few short years ago and the companies which have a good supply of men eligible for key positions are those which have had in the past and still operate good apprentice training programs.

Naturally, not all men who have served an apprenticeship possess the requirements necessary for a key position in industry. It is these men who, like the trained private soldier, will be the backbone of the production forces.

From the above, I believe we will agree that apprenticeship is an integral part of the defense program. Semi-skilled men for foundry operations can be trained in a relatively short time. The training of skilled foundry mechanics cannot be accomplished in a short time and neither can the necessary training time be reduced. Certainly the increased operating capacity demanded from industry under the present defense program will require more skilled men than do normal times.

Therefore, apprentice training should not be curtailed but rather expanded. The increased demand for skilled men within the foundry industry requires that, if it is to hold up its end of the program, apprentice training be pushed to capacity.

James G Goldie

J. G. GOLDIE, Chairman
A.F.A. Apprentice Training Committee

J. G. Goldie, foundry instructor, Cleveland Trade School, Cleveland, O., is chairman of the A.F.A. Apprentice Training Committee. Mr. Goldie has been an enthusiastic and energetic worker in the apprentice training field and has taken an active interest in all A.F.A. apprentice training activities. His position as foundry instructor in a large trade school enables him to keep in touch with apprentice problems as encountered by America's youth and his fingers on the pulse of general apprentice training practices. His value as a leader in this division was soon recognized by his fellow committeemen and at the 1940 convention in Chicago he was asked to serve as Apprentice Training Committee chairman, succeeding V. J. Hydar, Lockheed Aircraft Corp., Burbank, Calif.

American Foundryman

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February, 1941

Volume 3 **Number 2**

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Annual Foundrymen's Week—May 12 to 15

PLANS for the detailed program of the American Foundrymen's Association 1941 convention, which will be held at the Hotel Pennsylvania, New York, during the week of May 12, are beginning to take form. Some 14 technical committees of the Association have for some time been busy planning details for the 37 sessions scheduled.

A feature of unusual interest will be the continuation of the Convention Lecture Course, which has been looked upon by many attending foundrymen as one of the many highlights during convention week. The 1941 lecture course on "Core Practice" will be presented by Harry W. Dietert, H. W. Dietert Co., Detroit, Mich. The interest shown in this subject is wide spread because data from leading authorities all over the country is finding its way into the committee's hands. The outcome of this research and compilation project will be a series of three or four lectures to be presented at various times during the convention. Eventually this work will be published in book form by the Association.

Other features of the program will deal with the practical and scientific accomplishments made in the casting field. The papers and reports will stress the developments of the industry which are of outstanding importance in the production of castings for the National Defense Program. Problems of interest to all branches of the foundry industry and questions of particular importance to each of the various sub-divisions of castings manufacture are included in the technical program. Round-table and shop course meetings will be scheduled to cover various branches of the industry and specific phases of products and processes related to castings manufacture. With interest in the shop courses growing rapidly since their first introduction several years ago, special attention will be given to these sessions on sand and cupola operation. The sessions have been tentatively arranged so that the malleable and non-ferrous sessions will be held on Monday and Tuesday, with the gray iron and steel meetings held the following two days. The opening session will be Monday morning, May 12, and the closing session Thursday afternoon, May 15.

The question of foundry costs, vital under present day conditions, will center attention at a special session under the direction of the cost committee. Then throughout the four day convention program will be sessions on subjects of a general nature, such as refractories, job evaluation and time study, costs, apprentice training, foreman training, safety and hygiene, plant and plant equipment.

The Metropolitan chapter, which is receiving the full cooperation and support of the Chesapeake and Philadelphia chapters, is under the chairmanship of R. J. Allen, Worthington Pump and Machinery Co., Harrison, N. J. This chapter will act as host to the visiting members and guests and will arrange for plant visitation, ladies' entertainment and numerous other activities connected with the holding of a convention. The chapter has set up a local committee which will be under the chairmanship of Sam Tour, vice president, Lucius Pitkin, Inc., New York City, a director of the chapter and past director of the Association.

The following list contains several program committee chairmen:

Foreman Training, A. D. Lynch, Young Radiator Co., Racine, Wisconsin.

Apprentice Training, Franklin Farrel III, Farrel-Birmingham Co., Ansonia, Conn.

Refractories, J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.

A night scene of Times Square.

Job Evaluation and Time Study, F. E. Wartgow, American Steel Foundries, East Chicago, Ind.

Plant and Plant Equipment, W. R. Jennings, John Deere Tractor Co., Waterloo, Iowa.

Foundry Costs, R. L. Lee, The Liberty Foundry, Inc., Wauwatosa, Wis.

Safety and Hygiene, E. O. Jones, American Foundrymen's Association, Chicago, Ill.

Malleable Division Round Table, J. H. Lansing, Malleable Founder's Society, Cleveland Ohio.

Malleable Castings, C. F. Joseph, Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.

Steel Division Round Table, R. S. Munson, Atlantic Steel Casting Co., Chester, Pa.

Steel Castings, T. N. Armstrong, International Nickel Co., New York City.

Patternmaking, Frank C. Cech, Cleveland Trade School, Cleveland, Ohio.

Gray Iron Castings, F. J. Walls, International Nickel Co., Detroit, Mich.

Non-Ferrous Round Table, C. V. Nass, Fairbanks Morse & Co., Beloit, Wis.

Non-Ferrous Castings, R. W. Parsons, Ohio Brass Co., Mansfield, Ohio.

Sand Research, Dr. H. Ries, Ithaca, N. Y.

Gray Iron Shop Course, K. H. Priestley, Eaton-Erb Foundry Div., Eaton Mfg. Co., Vassar, Michigan.

Sand Shop Course, E. E. Woodliff, Harry W. Dietert Co., Detroit, Mich.

1940 Bound Volume Transactions is Ready for Distribution

THE 1940 bound volume of *Transactions* of the American Foundrymen's Association, carrying the papers, committee reports and discussions presented at the 1940 Chicago Convention, is ready for distribution. Order cards have been sent to all members and distribution will be made in the near future.

The present volume is No. 48 of a series which constitute the greatest library of foundry information in the world, of both practical and technical nature. Volume 48 contains over 800 pages and should be a welcome edition to all foundries, gray iron, steel, malleable and nonferrous, because of the worthwhile information it contains.

As only a limited number of bound volumes of *Transactions* are printed each year, order your copy today to assure yourself that you will not have a gap in your library of foundry information. If you are a new member of the Association and have not yet begun your foundry library, make Volume 45 the first book in your library of foundry facts and data.

A limited number of volumes 37, 41, 45, 46 and 47 also are available and may be purchased for a nominal sum, as shown in the accompanying box.

Available Issues of Bound Volume Transactions

Vol.	No. Pages	Price to Members	To Non-Members
48 (1940)*	815	$3.00	$15.00
47 (1939)	989	3.00	15.00
46 (1938)	948	3.00	15.00
45 (1937)	850	3.00	10.00
41 (1933)	608	2.00	6.00
37 (1929)	751	2.00	6.00

*Copy of Volume 48, gratis to company members on request.

Shortage of Rail Scrap Imminent

MEMBERS of the Association have recently stated that there is a shortage of steel rail scrap for use in cupola charges. More recently, we have been informed that there has been some unofficial talk within the defense commission that foundries might be asked to forego the use of rails in cupola charges to assist rerolling mills in securing this type of material which is being used for the production of defense materials. Should the defense commission convert its present unofficial talk into an active request or demand, foundries should be in a position to substitute a type of scrap for steel which would be advantageous to them.

Anticipating this problem, the Association addressed letters to members of the Cupola Research Subcommittee on Scrap and to certain other prominent individuals within the gray iron foundry industry, asking their opinion on the use of steel rails in cupola charges and regarding the substitution of other types of materials. They were requested also to comment on the metallurgical effects of such substitution.

Several replies have been received indicating that a shortage of rails for cupola charges already is at hand. These letters indicate that the use of rail scrap is not mandatory for the production of high grade castings. Several have answered that they prefer other types of scrap, such as structural steels and automotive scrap, to rails in the cupola charge. This preference is based both on the fact that the substitution of alternative types of steel scrap are more economical and that there is little advantage to the use of rail scrap from a metallurgical point of view.

Several foundries have conducted tests in their cupolas using steel rail as against automotive steel, such as auto rims cut to proper length, and have found no advantage. One member states, "I know that the economics of the situation makes this (use of automotive scrap) more profitable and it is also a material whose distribution is more general with respect to location of foundries."

Third Comprehensive Index to Bound Volume Transactions Ready

THE bound volumes of *Transactions* of A.F.A. contain a vast amount of practical, technical and scientific data of vital interest to those engaged in the casting of metals. However, members who have libraries of bound volumes from past years often find it very difficult to locate a particular paper on a desired subject to which they wish to refer. Such a condition seriously impairs the value and usefulness of the information contained in bound volumes because of the difficulties encountered in locating specific data or information. This difficulty early was recognized by the Association and as a result, an *Index* of material contained in volumes 9 to 29, covering the years 1900-1921 inclusive was issued in the latter year. In 1930, a second *Index* of material contained in volumes 30 to 37, covering the years 1922-1929 inclusive was issued.

The third issue of this series of comprehensive indexes soon will be ready for distribution. It will cover bound volumes 38 to 48 of the years 1930-1940 inclusive and will make available to the membership a source of ready reference to the subject matter contained in these volumes.

Considerable time and effort have been taken to make this 1940 *Index* as comprehensive as possible. The contents of each paper in each bound volume have been cross-indexed frequently. To further assist those who will use this *Index* as a reference book, a list of authors is appended to the subject index and, in case of joint authorship of papers, the names of both authors are given.

Copies of the 1940 *Index* will be made available to all members of record of December 31, 1940 — company, honorary, personal, and associate—on request. Those who have become members of the Association since January 1, 1941, will be charged a small fee as the funds for publishing the *Index* were derived from dues of members of record as of December 31, 1940. All members of the Association will be sent an *Index request card* soon and those who have libraries of the quarterly *Transactions* or bound volumes, are requested to forward the cards to the National office as soon after receipt as possible.

The issuing of this, the third comprehensive *Index* to bound volumes of *Transactions*, is another service which A.F.A. renders its members in the interest of making available the valuable practical, technical and scientific data and information contained in these works.

Applications of Radiography Studied by Steel Division Committee

A most active committee has been the Steel Division Committee on Radiography which has functioned under the chairmanship of C. W. Briggs, Steel Founder's Society of America. This committee was initiated in 1936 to study the application and possibilities of the use of radiographic examination of castings. In its first report[1] to the 1936 convention recommendations were presented as to what could be done to benefit steel foundries through the use of this new laboratory tool.

The second annual report[2] was presented at the 1937 convention in Milwaukee with the committee reviewing the work that had been done, showing examples of steel castings examined by radiographic methods. Following this report the committee circularized the steel casting industry to find out how generally radiography was used and reactions to its use and for what purposes it was used. These findings were published as a report[3] before the 1938 convention. Of the 49 replies some 19 foundries reported the use of radiographic methods and the report as a whole was most interesting and instructive.

The 1939 report[4] discussed applications and methods which had been brought out through papers and reports presented before technical societies.

This year the committee is again surveying the industry to find out how the foundries now feel about radiography as contrasted to the opinion developed in 1938. This report will be presented before the convention in May at New York.

In addition to Mr. Briggs the following are serving on the Radiography committee:

J. J. Curran, Walworth Co., Greensburg, Pa.
R. H. Frank, Bonney Floyd Co., Columbus, Ohio.
W. C. Hamilton, American Steel Foundries, Chicago, Ill.
G. F. Landgraf, Lebanon Steel Foundries, Lebanon, Pa.
P. E. McKinney, Bethlehem Steel Co., Bethlehem, Pa.
E. W. Page, General Electric X-Ray Corp., Chicago, Ill.
L. C. Wilson, Reading Steel Castings Div., American Chain & Cable Co., Reading, Pa.

[1]Report of Steel Division Committee on Radiography, *Transactions*, vol. 44, pp. 589-591.
[2]Report of Committee on Radiography, *Transactions*, vol. 45, pp. 696-704.
[3]Report of Committee on Radiography, *Transactions*, vol. 46, pp. 280-296.
[4]Report of Committee on Radiography, *Transactions*, vol. 47, pp. 794-804.

Spectrochemical Analysis Bibliography Available

MEMBERS interested in spectrochemical analysis will be interested to learn that the British Non-Ferrous Metals Research Association, Euston Street, London, N. W. 1, England, has issued the second edition of its "Bibliography of Spectrochemical Analysis." The bibliography is compiled by D. M. Smith and contains over 500 references.

Safety

Safe Sling Practice

By J. M. Garris*, Kenosha, Wis.

THE common method of attaching a load to the crane is by means of a sling and it is generally a catch-as-catch-can proposition. Lifting beams, single-purpose slings and other special devices, which connect directly with the crane hook, present little or no problem on safe practice. Such equipment is designed to meet certain operating conditions and the method of attachment cannot be varied.

Three kinds of slings—manila rope, chain and wire rope—are used in foundry work. Any consideration of safe practice demands the inclusion of all three classes, since the methods of application and stresses encountered are common to all three. Each class of sling has peculiar advantages for certain kinds of work and these advantages often are so pronounced as to make the use of that particular class of sling imperative.

The safety of any sling depends largely upon the selection of materials recognized as being suitable for sling work and the exclusion of everything else not uniform in quality and consistent in behavior when under operating conditions. The best is none too good where the safety of life, limb and property may be menaced by the use of a sling. Safe practice, therefore, begins with the adoption of dependable materials, known to have the ability and stamina to undergo the brutal service imposed by sling work.

Manila Rope

Manila fiber has long been recognized as being the best material for rope where strength and durability are the prime requirements. Rope of three-strand construction is the best for sling purposes because of its higher strength, better equalization on sharp bends and greater splice efficiency.

Chain

The reliability of a chain depends upon sound welds and the consistent behavior of the metal of which the chain is made. Wrought iron, having a carbon content below 0.05 per cent and manganese below 0.10 per cent, is generally accepted as meeting these requirements. It is easy to weld, has a fibrous nature and invariably gives warning of approaching failure. These three characteristics are so well established that safe practice would seem to demand its use.

Wire Rope

Wire rope slings, a recent innovation as compared to manila ropes and chains, already hold an important place in all branches of industry and are used almost exclusively for lifting heavy loads. The process of wire drawing is a continuous proof-testing operation in itself and the methods of fabrication readily lend themselves to the production of a sling of great strength and dependability.

Safety Factors

The ever present danger of indeterminate stresses encoun-

Table I

Composite Sling Chart

(Safe Loads in Tons of 2000 Lb.)

Size, In.	Atlas 8-Part Slings 1 Leg Vertical—(90°) Safe 3	Load 5	Factors 7
1/8	1.29	0.77	0.53
5/16	2.85	1.71	1.22
1/4	5.41	3.25	2.72
5/16	8.40	5.04	3.71
3/8	11.76	7.06	5.04
7/16	15.68	9.41	6.72
1/2	20.16	12.10	8.64
9/16	25.20	15.12	10.80
5/8	30.98	18.59	13.28
3/4	44.24	26.54	18.97

Size, In.	Monarch Slings 1 Leg Vertical—(90°) Safe 3	Load 5	Factors 7
3/8	1.79	1.20	0.85
1/2	3.42	2.05	1.49
5/8	4.27	3.15	1.93
3/4	7.50	4.50	3.21
7/8	9.44	5.67	4.05
1	12.32	7.39	5.29
1 1/4	16.81	10.09	7.20
1 1/2	24.10	14.46	10.33
1 3/4	29.87	17.93	12.90
2	38.75	23.25	16.60

Size, In.	Iron Chain Slings 1 Leg Vertical—(90°) Safe 3	Load 5	Factors 7
3/8	1.50	0.90	0.64
1/2	2.50	1.50	1.07
5/8	3.51	2.31	1.67
3/4	5.63	3.38	2.70
7/8	7.78	4.67	3.33
1	10.33	6.20	4.43
1 1/4	16.00	9.60	6.83
1 1/2	22.60	13.60	9.70
1 3/4	29.16	17.50	12.80
2	37.00	22.20	15.83

Size, In.	Manila Rope Slings 1 Leg Vertical—(90°) Safe 3	Load 5	Factors 7
5/8	0.66	0.40	0.28
3/4	0.81	0.49	0.35
7/8	1.16	0.70	0.50
1	1.37	0.82	0.58
1 1/4	2.08	1.25	0.89
1 1/2	2.75	1.65	1.18
1 3/4	4.08	2.43	1.75
2	5.00	3.00	2.14
2 1/4	6.41	3.85	2.75
2 1/2	7.25	4.35	3.10

Three safe load ratings are given for convenience of selection. A factor of 5 is recommended for general duty, a factor of 7 for hard, continuous usage and a factor of 3 only for occasional use.

*Manager, Sling Dept., Macwhyte Company.

tered in all sling work requires the use of slings having a reserve strength several times greater than the weight of the loads lifted. Hence, safe working loads always are based on a definite safety factor, which is the number of times a given load can be divided into the ultimate strength of the sling.

There is a wide difference of opinion as to what constitutes a safe working load. Sling users and sling makers employ safety factors ranging from 2.5 to 7 and one wire rope company recently suggested that a factor of 8 be used. Where such recommendations are made, the factor usually refers to catalog strength of the rope and not to the strength of the sling after fabrication. Obviously, any losses due to fabrication should be deducted in order to determine the safety factor with any degree of accuracy.

Chain manufacturers generally suggest one-third of the chain strength as being satisfactory for a safe working load and recommendations for factors higher than 4 are very rare. Manila rope slings should carry a safety factor of 4, and wire rope slings a factor of 5, according to the data published by the makers of both. It is not unusual, however, to find sling charts in shop and field use which vary widely from these figures.

Naturally, a generous safety factor is of prime importance wherever danger to life and property is involved and yet the factor adopted always should be within reason. The higher the safety factor, the more cumbersome the sling, and its use often entails greater hazard than would be encountered by a lighter sling. There are some safety papers, for instance, which recommend a safety factor of 8 for chain slings and a factor of 11 for wire rope slings. Both of these factors may be desirable, and even necessary, under certain extreme operating conditions, but they would defeat the purpose of safe operation if adopted for general work.

In view of this lack of agreement among safety men, sling makers and sling users, it becomes evident that some new approach is needed to secure a better meeting of minds on the subject. Since some latitude in safety factors appears very desirable, calculations can be made more conveniently if based upon tables showing safety factors of 3, 5 and 7 for all three classes of slings.

Safe Sling Loads

Table 1 is a composite sling chart which embraces ten popular sizes in each of the four subdivisions, braided slings being included because they are designed exclusively for sling work and are rapidly taking the place of the older types. Three safe load values are given for each of the four types, or classes of slings, figured in tons of 2,000 lb. In all cases, the safe load selected can be multiplied by the factor at the top of the column (in which it appears) to determine the ultimate or breaking strength of one leg vertical.

Where two legs operate under various conditions, the following factors for computing safe loads will be found convenient:

60°—Safe load selected × 1.732
45°—Safe load selected × 1.414
30°—Safe load selected × 1.000
20°—Safe load selected × 0.684
15°—Safe load selected × 0.517
10°—Safe load selected × 0.346
5°—Safe load selected × 0.174

For three legs, these factors must be increased 50 per cent and doubled for four legs. In all cases, the result multiplied

Sling Load Chart

This chart illustrates the variation of stress on one sling leg when applied to a constant 1000 pound load at various angles "A"

The stress on each leg of a sling assembly is found by the formula: $S = \frac{W}{N \times \text{Sin "A"}}$, where "S" is the stress on one leg, "W" is the total load, "N" is the number of sling legs employed, and "A" is the angle of lift

LOAD CHART of Sling Stress at Various Angles of Inclination

ANGLE	SLING STRESS	SINE of ANGLE "A"	VERTICAL LOAD
90°	1000 lbs.	1.00000	1000 lbs.
85°	1003 lbs.	.99619	1000 lbs.
80°	1015 lbs.	.98481	1000 lbs.
75°	1035 lbs.	.96593	1000 lbs.
70°	1064 lbs.	.93969	1000 lbs.
65°	1103 lbs.	.90631	1000 lbs.
60°	1154 lbs.	.86603	1000 lbs.
55°	1220 lbs.	.81915	1000 lbs.
50°	1305 lbs.	.76604	1000 lbs.
43°	1414 lbs.	.70711	1000 lbs.

ANGLE	VERTICAL LOAD	SINE of ANGLE "A"	SLING STRESS
0°			
5°	1000 lbs.	.08716	11473 lbs.
10°	1000 lbs.	.17365	5759 lbs.
15°	1000 lbs.	.25882	3863 lbs.
20°	1000 lbs.	.34202	2924 lbs.
25°	1000 lbs.	.42262	2366 lbs.
30°	1000 lbs.	.50000	2000 lbs.
35°	1000 lbs.	.57358	1743 lbs.
40°	1000 lbs.	.64279	1555 lbs.
45°	1000 lbs.	.70711	1414 lbs.

EXAMPLE

Problem: 100,000 lbs. is to be lifted by a 4-leg sling assembly, each leg lifting at an angle of 45° What will be stress on one leg?

Procedure: (See Formula at top of page)

W = 100,000 lbs.; N = 4; Sin 45° = .70711

$S = \frac{100{,}000}{4 \times .70711} = 35{,}355$ lbs. (Stress one leg)

Had the legs all been lifting vertically, (A = 90°; Sin 90° = 1), the stress in each leg would have been only

$\frac{100{,}000}{4 \times 1} = 25{,}000$ lbs.

Fig. 1—Effect of Angle of Inclination on Single Sling Leg Under a Constant Load of 1,000 Lb.

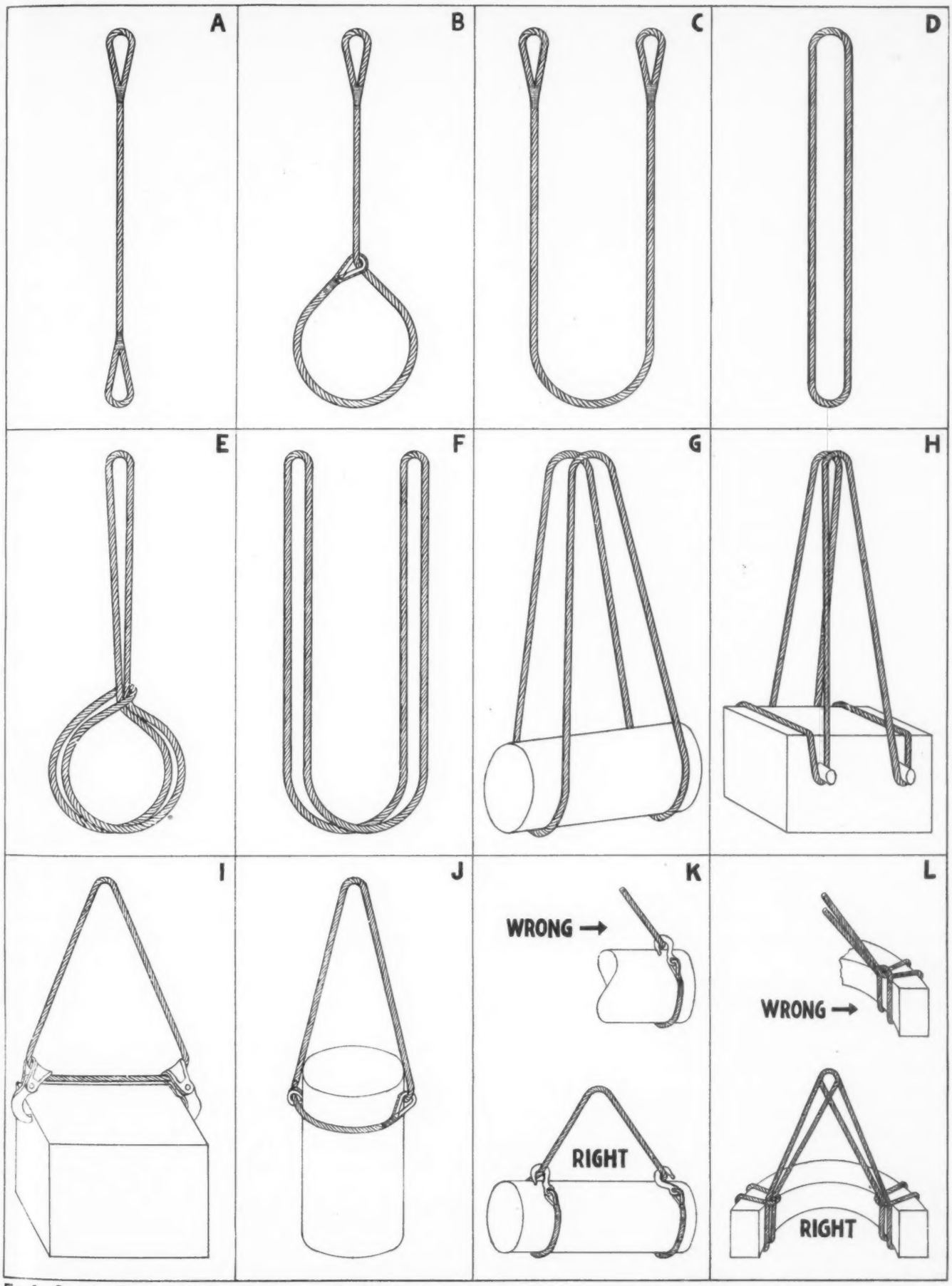


Fig. 2—Common Types of Hitches. To Compute the Safe-Loads of Hitches "B" to "J" included, Multiply the Safe-Load for One Leg Vertical (Table 1) by the Efficiency Factors Shown in Parentheses for Each Type of Hitch.

A—One Leg Vertical, Safe Loads as in Table 1 B—Anchor Hitch (0.75) C—Basket Hitch (1.414) D—Endless Sling (1.414) E—Endless Sling Anchor Hitch (1.414) F—Endless Sling Basket (2.828) G—Inverted Basket Hitch (2.828) H—Toggle Hitch (2.828) I—Stone Dog Hitch (1.414) J—Double Anchor Hitch (1.414) K and L—Bridle Anchor Hitches, Right and Wrong Methods

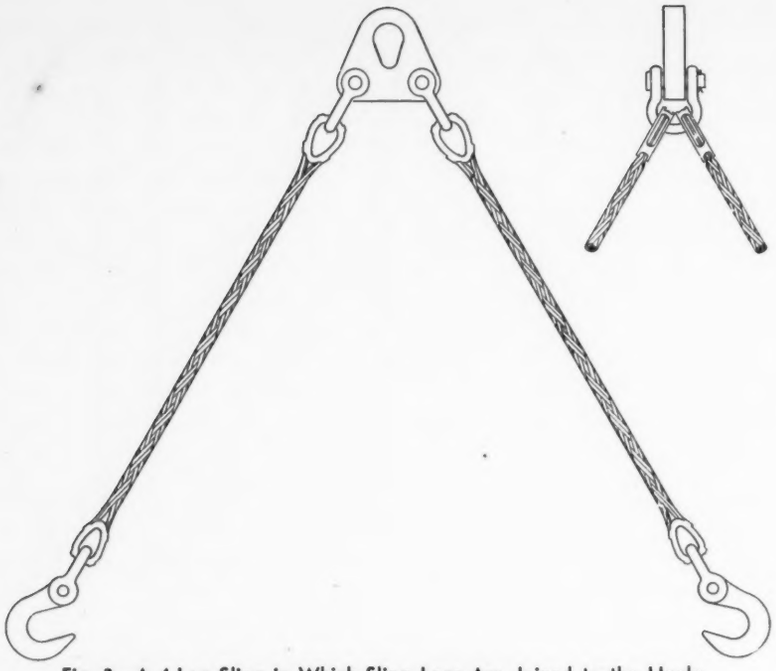


Fig. 3—A 4-Leg Sling in Which Sling Legs Are Joined to the Hooks and Load-Links by Shackles.

by the safety factor of the safe load selected will show the ultimate strength of the sling assembly. This, in turn, can be divided by the actual weight lifted at a given angle to determine the exact safety factor.

Safety factors less than 3 are never recommended and 30° is the minimum angle for safe sling application. It is not unusual, however, to see slings loaded up to 60 per cent of their actual breaking strength. Sometimes this overloading is necessary due to an emergency, or lack of proper equipment. However, more frequently it is the result of ignoring the additional stresses imposed by the angle of inclination and method of attachment.

Fig. 1 shows the effect of the angle of inclination on a single sling leg under a constant load of 1,000 lb. and emphasizes the necessity of employing generous safety factors on slings for general work. Reference to this table will indicate that a sling capable of handling a 1,000 lb. load with a safety factor of 3 at 90° would be reduced to a factor of only 1½ if applied at 30° and its breaking strength would be reached at approximately 20°.

Methods of sling attachment to the load, known as hitches, result in further reduction of sling efficiency and should always be taken into consideration in determining safety factors. The common type of hitches are shown in Fig. 2. All of the foregoing information applies to Table 1, or to any other chart showing the safe load for one leg vertical.

Fig. 1 provides another method of selecting the size of sling necessary to carry a known load with an approximate safety factor. The example here is based upon a 50 ton load handled with a 4-leg sling at an angle of 45°. A 5 ton load would be one-tenth of the values shown; hence, the stress on one leg would be 3,535 lb. or 1.76 tons. Reference to Table 1 indicates that it will require a 3/16-in. Atlas, ½-in. Monarch, ⅝-in. chain and 1½-in. manila rope, respectively, to handle a 5 ton load with a safety factor of 5 under these conditions.

Sling Fittings

Sling fittings always present a problem and this is particularly true in foundry work. The hooks required are usually of the slender type with extra wide opening and many lifting operations necessitate loading the hook points. Since this cannot be avoided, slings for foundry service should be designed to permit the use of interchangeable fittings.

Flame-cut hooks and load links open a new field for correct design and the economical production of such fittings. A 4-leg sling of this type is shown in Fig. 3, in which the sling legs are joined to the hooks and load-link by shackles. The elimination of all welds, correct bearing of shackle pins and freedom of leg movement are all definite contributions to safe practice and any part of the sling assembly can be replaced at a nominal cost.

Wire rope slings, having one or two legs, generally are used directly over the crane hook, with a shackle in the lower end to facilitate attachment or removal of end fittings. Such an arrangement also permits the use of manila rope, chain and wire rope wear members, a practice which always results in reducing the cost of sling maintenance.

Editor's Note—It is suggested that the chart, Fig. 2, be clipped from this issue of *American Foundrymen* and posted on your bulletin board.

Reports Bond Clay Investigations

THE Illinois State Geological Survey Division of the Department of Registration and Education, University of Illinois, Urbana, Ill., recently has issued a *Report of Investigations No. 69* covering a series of studies of the basic factors that control the properties of natural molding sands and clays used for rebonding molding sands.

The booklet includes three papers which have been presented before annual meetings of A.F.A. These are (1) Elements of the Petrographic Study of Bonding Clays and Clay Substance of Molding Sands, by Ralph E. Grim, (2) Mineral Composition and Texture of Clay Substance of Natural Molding Sands, by R. E. Grim and C. E. Schubert, and (3) The Relationship Between the Physical and Mineralogical Characteristics of Bonding Clays, by R. E. Grim and R. A. Rowland.

Copies of this booklet may be obtained gratis from the Illinois State Geological Survey Division of the Department of Registration and Education, University of Illinois, Urbana, Ill.

Chesapeake Chapter Rings the Bell

THE Chesapeake chapter retains the lead in the membership drive for the second month. The Wisconsin chapter which was tied for third place last month with the Metropolitan chapter moved into second place, Central New York and Northeastern Ohio holding their positions. Western New York and Southern California switched positions, Southern California moving up into sixth position.

Birmingham, Cincinnati and Detroit are tied for eighth place in the second division, followed closely by Chicago. Quad City jumped out of the cellar over Northern Illinois-Southern Wisconsin and Philadelphia.

The trophy traveled to Baltimore, Md., where Chairman Horlebein used it to call the January meeting of the Chesapeake chapter to order. They think it is a very useful trophy and write that it is going to take a lot of new members to start it traveling again.

There are still six places left on the trophy for the monthly winner's name, Chesapeake having the honor so far of its name appearing twice. Chesapeake no doubt would like to monopolize these places of honor and make it a clean sweep so it's left in the hands of the other chapters as to whether they will have their wish.

A complete scoring to December 31 is shown in this issue.

Top—Chapter chairman E. W. Horlebein (center), opening the meeting of the Chesapeake chapter with the new membership bell. Also at the table are C. L. Frear (left) and L. H. Denton (right). Bottom—R. T. Covington with the membership bell. The sign in the picture shows Chesapeake's determination to make the bell a permanent fixture.

Dunbeck to Present Exchange Paper

NORMAN J. DUNBECK, vice president, Eastern Clay Products, Inc., Eifort, Ohio, is to present the annual international A.F.A. exchange paper from the American Foundrymen's Association to the Institute of British Foundrymen. This continues the policy of exchanging papers which dates back to 1920. The first exchange paper was presented in 1922 and the policy has been continued by these two organizations for 19 years.

Mr. Dunbeck's article deals with synthetic sand practice. The author, who is one of the country's foremost men on synthetic sand, will summarize in his report the American practices in synthetic sand control.

With conditions as they are in England, the I.B.F. has not scheduled an annual meeting this year. However, Mr. Dunbeck's paper possibly will be presented to English foundrymen through the Institute's *"Proceedings"* and its official house organ, *"The Foundry Trade Journal."*

New Members Enrolled in Chapters

From July 1 to December 31, 1940

Place	Chapter	Sustaining	Company	Affiliate	Personal	New Members	Total Points
1st	Chesapeake	1	4	29	5	39	855
2nd	Wisconsin	0	5	15	4	24	595
3rd	Central New York	1	1	26	1	29	570
4th	Northeastern Ohio	0	3	14	5	22	510
5th	Metropolitan	0	3	14	4	21	480
6th	Western New York	0	3	13	4	20	465
7th	Southern California	0	2	12	4	18	400
8th	Birmingham	0	1	12	1	14	260
8th	Cincinnati	0	4	4	0	8	260
8th	Detroit	0	1	6	4	11	260
9th	Chicago	0	0	10	3	13	240
10th	Northern California	0	0	9	3	12	225
11th	Ontario	0	2	3	1	6	175
12th	St. Louis	0	0	3	4	7	165
13th	Michiana	0	1	5	1	7	155
14th	Central Indiana	0	1	3	1	5	125
14th	Quad City	0	1	5	0	6	125
15th	Philadelphia	0	0	4	2	6	120
16th	No. Illinois-So. Wisconsin	0	1	1	0	2	65
		2	33	188	47	270	6050

NEW MEMBERS

Birmingham Chapter

Robert Coleman, Jr., Metallurgical Dept., American Cast Iron Pipe Co., Birmingham, Ala.
D. T. Hull, Casting Machine Foreman, American Cast Iron Pipe Co., Birmingham, Ala.

Central Indiana Chapter

*Harrison Steel Castings Co., Attica, Ind. (G. C. Dickey, Ass't General Supt.)

Central New York Chapter

John R. Young, Sand Research Fellow, Exp. Engrg. Dept., Cornell University, Ithaca, N. Y.

Chesapeake Chapter

Carl C. Ackerling, Molder, U. S. Naval Gun Factory, Washington, D. C.
*Bethlehem Steel Co., Maryland Plant, Sparrows Point, Md. (C. C. Adams, Gen'l Foundry Foreman)
H. A. Elver, Ass't Foreman, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.
Donald F. Lane, Supv. of Apprentices, Bethlehem Steel Co., Maryland Plant, Sparrows Point, Md.
John G. Luber, Molder, Bethlehem Steel Co., Maryland Plant, Sparrows Point, Md.
Edward G. Marsh, Leadingman, U. S. Naval Gun Factory, Washington, D. C.
Edward A. Mattison, Leadingman, U. S. Naval Gun Factory, Washington, D. C.
John W. Mentzner, Lancaster, Pa., Taggart & Co., Philadelphia, Pa.
J. Arthur Reese, Foundry Met., Koppers Co., American Hammered Piston Ring Div., Baltimore, Md.
Joseph L. Rodgers, Leadingman, U. S. Naval Gun Factory, Washington, D. C.
Eugene H. Ryer, James J. Lacy Co., Baltimore, Md.
Orville Hood Scheel, Chemist, Koppers Co., American Hammered Piston Ring Div., Baltimore, Md.
Harry Milton Tracy, Bronze Furnace Supv., Koppers Co., American Hammered Piston Ring Div., Baltimore, Maryland
William C. Waters, Leadingman, U. S. Naval Gun Factory, Washington, D. C.
Robert F. Willey, Baltimore, Md., Salesman, Bethlehem Steel Co., Bethlehem, Pa.

Chicago Chapter

Geo. J. Hurwitz, Western Foundry Co., Chicago, Ill.
Meredith E. McKinney, Metallurgist, International Harvester Co., McCormick Works, Chicago, Ill.
Ray E. Slater, Fdry. Consultant, L. A. Cohn & Bro., Inc., Chicago, Ill.

Detroit Chapter

F. S. Brewster, The Dow Chemical Company, Midland, Michigan.
K. Randall, Saginaw Malleable Iron Co., Saginaw, Mich.
F. A. Wagner, Vice President, Centrifugal Fusing Co., Lansing, Mich.

Metropolitan Chapter

*Franklin Railway Supply Co., Inc., New York, N. Y. (G. W. Alcock, Vice President)
V. A. Gammon, Foundry Foreman, American Brake Shoe & Foundry Co., Mahwah, N. J.

Michiana Chapter

Leonard F. Tucker, Partner, City Pattern Works, South Bend, Ind.

Northeastern Ohio Chapter

*Carl-Mayer Corp., Cleveland, Ohio (C. F. Mayer, President)
*Cleveland Metal Abrasive Co.. Cleveland, Ohio (O. S. Stewart, President)
Lewis T. Crosby, Dist. Mgr., Cleveland, Ohio—Sterling Wheelbarrow Co., Milwaukee, Wis.
F. J. Frederiksen, Mfg. Eng., Westinghouse Electric & Mfg. Co., Cleveland, Ohio
Bruce B. Krost, Woodling & Krost, Cleveland, Ohio
Michael J. Horkan, Instructor, East Tech High School, Cleveland, Ohio
*Lederer Iron & Steel Co., Cleveland, Ohio (J. E. Oettinger, Salesman)
*E. A. Schwarzenberg Co., Cleveland, Ohio (H. D. Kaufman, President)
*Warner & Swasey Co., Cleveland, Ohio (Donald Gurney, Metallurgist)
*Webster Manufacturing, Inc., Tiffin, Ohio (R. J. Brandt, Fdry. Engr.)

Northern California Chapter

Edward S. Cavoretto, Molder, Enterprise Foundry Co.. San Francisco, Calif.
Charles M. Pierce, Fdry. Supt., American Manganese Steel Div., American Brake Shoe & Fdry. Co., Oakland, Calif.

Philadelphia Chapter

A. de Macedo, Vice President, Philadelphia, Pa., Alpha-Lux Co., Inc., New York, N. Y.
Otmar L. Olsen, E. I. DuPont de Nemours Co., Wilmington, Del

Quad-City Chapter

The Adams Company, Dubuque, Iowa
*Louden Machinery Co., Fairfield, Iowa (G. A. Zillman)
John B. Meyers, Supt., The Adams Company, Dubuque, Iowa
E. C. Wussow, Fdry. Supt., J. I. Case Co., Rock Island, Illinois.

St. Louis District Chapter

Otto P. Arneson, Arneson Pattern Co., St. Louis, Mo.
J. R. Bodine, President, J. R Bodine Pattern & Foundry Co., St. Louis, Mo.
Luther A. Kleber, Ass't to Supt., Fdry. Dept., General Steel Castings Co., Granite City, Ill.
*General Steel Castings Corp., Granite City, Ill. (Harry E. Thiele, Supt.)
Fred W. Wack, Jr., President, Central Pattern Co., St. Louis, Mo.

Southern California Chapter

*Musto-Keenan Co., Los Angeles, Calif. (Elwood L. Keeler, Ass't. Secretary)

Western New York Chapter

*Alloys & Products, Inc., Rochester, N. Y. (Henry Hecht, President)
John C. Carl, Sales Engr., Ingersoll-Rand Co., Buffalo, New York
Harry G. Ekdahl, Partner, Economy Pattern Works, Buffalo, N. Y.
Fred G. Hendler, Aero Pattern Works, Buffalo, N. Y.
Gilbert T. Mason, Sales Mgr., Alloys & Products, Inc., Rochester, N. Y.
Robert Putnam, Symington-Gould Corp., Rochester, N. Y.
Henry Schnier, Foreman, Pohlman Foundry Co., Inc., Buffalo, N. Y.
Arthur E. Smith, Sales Engr., Buffalo, N. Y., National Engineering Co., Chicago, Ill.

Wisconsin Chapter

H. W. Beckman, Foreman, Brass Fdry., Allis-Chalmers Mfg. Co., West Allis, Wis.
*Claus Manufacturing Co, Milwaukee, Wis. (Joseph Meisler, Fdry. Foreman)
Harry E. Bremer, Owner, H. E. Bremer Mfg. Co., Milwaukee, Wis
*Fire Brick Engineers, Inc., Milwaukee, Wis. (H. J. Schofield, Mgr.)
John J. Joyce, Salesman, Fire Brick Engineers, Inc., Milwaukee, Wis.
*Lumbermen's & Mfgrs. Mutuals of Wisconsin, Inc., Milwaukee, Wis. (Geo. W. Peterson, Vice President)
John F. McCall, Time Study, Smith Steel Foundry Co., Milwaukee, Wis.
J. J. McDevitt, Milwaukee, Wis., Sales—S. Obermayer Co., Chicago, Ill.
John B. Strauch, Salesman, Fire Brick Engineers, Inc., Milwaukee, Wis.
B. A. Uphoff, Foreman, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Outside of Chapter

Willard D. Carter, Engineering, Standard Automotive Parts Co., Muskegon, Mich.

*Company.

(Continued on Page 13)

Notes on Foundry Sand Research—I

By Dr. H. Ries, Ithaca, N. Y.

Dr. H. Ries, Cornell University, Ithaca, N. Y., is Technical Director, Foundry Sand Research Committee. The report below, submitted by Dr. Ries, gives pertinent information concerning the progress of his committee during the past year. Comment on what action the committee is taking on the various tests and pieces of apparatus which the committee recommended for use in the foundry as a means for sand control, but which have proved to some extent to be inefficient in actual foundry practice, is made. Further comment is made on tests under investigation such as the sintering test, core hardness test and tests of steel sands at high temperatures.

IT has commonly been the custom for the Chairman of the Foundry Sand Research Committee to make a report annually, informing members of A.F.A. of any action which the Committee has taken during the preceding 12 months. While the writer shall not neglect this point, there are several other matters to which he desires to draw attention.

It is now nearly 19 years since the Foundry Sand Research Committee came into existence. The importance of sand properties was realized at that time, and efforts had been made to evaluate some of them.

However, it is safe to say that it was not until the Foundry Sand Research Committee began work that we appreciated how important the sand properties then known to us might be; how little we really knew about them; and, as it subsequently developed, that there were additional properties which had been overlooked.

Perhaps this last point is one of the reasons why the Committee is still on its job. The General Committee and its subcommittees began seriously to develop methods for testing sand properties. Every test was tried out before it was publicized. It was at first recommended as a tentative standard, and not passed as a permanent standard until it had undergone the scrutiny of both friendly and hostile critics for at least a year.

Those tests which have been recommended by the Committee are included in the A.F.A. Handbook on *"Testing and Grading Foundry Sands and Clays,"* now in its fourth edition. Any others which may be recommended before the appearance of a new edition will be published in *American Foundryman.*

There are also some tests which have been used by individuals, and referred to in the literature, but which have not thus far been recommended by the Foundry Sand Research Committee.

The original function, which all tests were supposed to serve, was that of enabling the foundryman to keep track of the condition of the sand in his heaps and systems, and if these were not suitable, to be able to correct them. This then led to the use of these tests for sand control, and for this purpose the writer thinks everyone recognizes their value. Since, however, the tests serve to show the qualities of the sand, some foundrymen make use of them to specify the character of the material which they order.

It should be recognized that it is *not* the function of the Foundry Sand Research Committee to set up specifications for materials. It *is* the duty of the Committee to specify conditions that a piece of apparatus must meet to correctly evaluate properties of sand. Further, it is *not* the function of the Committee to recommend one type of apparatus over another.

If any foundry desires to use, for specification purposes, the properties as determined by tests, it is entirely a matter of its own concern. Many foundries do this, and, so far as the writer is able to ascertain, there have been few objections from the producer.

The Committee on Sand Research realizes that some of the tests might be improved, and efforts to accomplish beneficial changes are now under way. There have been cases where some test or piece of apparatus has been strongly criticized, but it has usually been found that in such instances the fault lay with the operator and not with the test or apparatus.

Comments on Tests and Apparatus

Preparation of sample—It may be said that in general there are two ways of mixing a sand for laboratory testing. One consists in adding the desired amount of moisture and mixing thoroughly by hand. The other consists in using a mechanical mixer, such as a laboratory muller, mixing the sand first dry and then moist.

These two methods of preparation, when applied to naturally-bonded sands, may in some cases give different results. The mulled sand usually shows a lower permeability and higher compression strength than the hand mixed. A difference may even be noticed in the latter, depending on the intensity with which the hand mixing is done.

It seems probable that the differences above mentioned may be particularly noticeable in high clay sands, or those in which the clay is not uniformly distributed in the natural sand. Mulling would distribute the bond better.

An interesting case of this in practice came to the writer's attention while visiting a Pacific Coast foundry.

Here the same mixture, with 6½-7 per cent moisture gave the following results when treated in different ways:

	Muller	Cutter
Permeability	60	75
Green compression, lb. per sq. in.	4.5	3.2

The reason for this is quite evident from what has been said above.

The following figures obtained from different sources give the results obtained by hand and muller mixing:

Table I

Clay Per Cent	Water Per Cent	Hand Mixed Green Comp.	Hand Mixed Perm.	Muller Mixed Green Comp.	Muller Mixed Perm.
21.0	7.5	11.1	18.4	20.2	21.2
17.0	7.0	14.0	99.0	16.3	67.0
15.4	7.0	15.2	72.0	17.1	55.0
15.0	8.0	4.0	160.0	7.3	75.0
14.9	8.0	5.6	61.0	10.3	15.0
27.4	8.0	9.1	42.0	12.8	11.0

Testing Apparatus—Although the testing of sands is now being widely used, it should be more extensively employed. Apparently some members of the industry feel that the apparatus now on the market is rather expensive. The Committee is always open to suggestions for simplification of apparatus which will enable it to be made and sold more cheaply, so that more foundries can make use of it, keeping in mind the necessary accuracy of the particular instrument involved.

On some occasions, an ingenious foundryman develops a set of home-made apparatus which appears to meet his needs. Mention might here be made of the Hercules Foundries, Inc., Los Angeles, Calif., that has such a set, the total cost of which was about $20.00. It is used for daily sand control, including the determination of moisture, green compression and permeability. The foundryman using it cannot check with any other foundry in terms of standard units, but, for his own work, it gives fair satisfaction and he deserves to be complimented for his ingenuity. This apparatus has been described in the *American Foundryman*, August, 1940.

Fineness test—This involves two features, *viz.* (1) The separation of the grain into different sizes by means of sieves, and (2) determination of A.F.A. clay.

The Foundry Sand Committee of the National Industrial Sand Association has been giving considerable attention lately to the separation of the different-sized sand grains by sieves, and the fact that different laboratories do not always get a close agreement when even the same sand sample is tested by them.

The writer thinks it is safe to say that the disagreements are usually not great. Where there is a marked exception shown, this may be so large as to suggest that something is wrong with the technique, sieves, or method of taking sample. The fact that different laboratories sometimes differ markedly, has led to the proposal that we should eliminate the suggested tolerance figures in our purchase forms.[1] As the writer reported last year, this has been done, leaving the adjustment to producer and consumer. Curiously enough these suggested tolerances above referred to are larger than most of those which the writer has seen in specifications issued by consumers. Attention is also called to the fact that the purchase forms referred to above are recommended only as a guide to purchasing and are not standard.

[1] *Standards and Tentative Standards for Testing and Grading Foundry Sands and Clays*, 1938 edition, pp. 83-84.

It may be added that the A.F.A. is co-operating with the Foundry Sand Committee of the National Industrial Sand Association.

All foundries do not use certified sieves, and it will be interesting to ascertain whether this makes much difference in the results. In addition to studying sieve tests of silica sands, the Foundry Sand Committee of the National Industrial Sand Association is also studying the results obtained by testing samples of the same naturally bonded molding sands in different laboratories.

Life of Sieves—There is no doubt that some sieves become inaccurate through use. This might be due to (1) holes in the mesh or tears around margin of the sieve which might go unnoticed in the hands of a careless operator; (2) spreading of the meshes due to improper methods of cleaning the sieves; (3) excessive blinding of the sieves; or (4) wearing of the wires.

In this connection, the writer has attempted to get some accurate data on the life of sieves. One series of figures supplied me showed that a 200 mesh sieve seemed to be in good shape after a year's use.

The Soil Conservation Laboratory, Pasadena, Calif., states that its sieves are calibrated with a standard sand sample that is kept on hand. The writer is informed by G. H. Otto that "With our present rules for cleaning sieves, I fully expect an average sieve life in excess of 1,000 analyses for sieves finer than 1 mm. opening," and, "Sieve life is undoubtedly connected with sieving time, sample weight, as well as mode of cleaning."

A third operator reports that they get approximately 18 months service per set, running probably six samples daily.

The coarser meshes seem to wear more rapidly, as several operators have testified.

A.F.A. Clay Determination—The determination of the A.F.A. clay presents another problem. It is argued by some that the time required for washing out the clay by the settling and siphoning method is altogether too long, although even here the period required seems to vary greatly with different operators.

Let me call your attention to several short-cut methods which are used.

Mr. C. Mathiesen has pointed out that using two 2-min. periods, and the balance one minute periods of settling, gives practically the same results as the standard method, down to and including the 270 sieve. It makes a great difference in the pan material. Of course, if anyone wanted to include pan with clay, it would be his privilege to do so.

The Cincinnati Milling Machine Co., Cincinnati, Ohio, uses a funnel (Fig. 1) developed by W. A. Rengering, the sides of which have a 60° slope. Across the bottom is a 270 mesh sieve. Water flows up through the stem of the funnel and overflows at the top. The sample of sand, after being dispersed in the usual manner with sodium hydroxide, is then dumped into the funnel and the flow of water so adjusted that only A.F.A.

clay is carried off at the top. What remains in the funnel is then dried and transferred to the sieves. It is said that by using two funnels it is possible to run as many as eight samples per day, depending on the clay content and grain size.

Another method in successful use consists in dispersing the sand sample in the usual manner. It is then transferred to a 1,000 cc. graduate, distilled water is added and the cylinder upended several times for one minute. The grains are then allowed to settle and, at the end of 5 min., the amount of material less than 20 microns in size

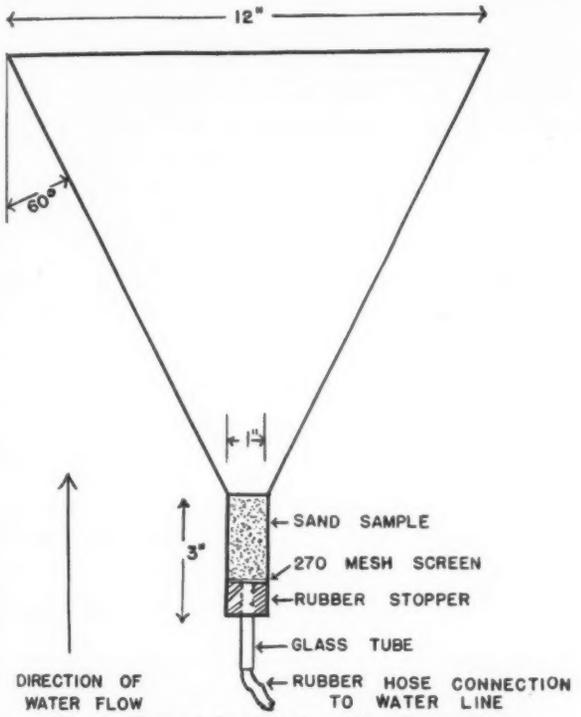


Fig. 1—Funnel for Making Clay Separation.

can be determined with a pipette[2] or at the end of a slightly longer period if a hydrometer[3] is used. The pipette method is used for sand testing at the Naval Research Laboratory in Washington.

Fineness Number—Some years ago the Committee recommended a method for calculating the average fineness of a sand and this is widely used, although some have objected to the inclusion of pan material in this calculation. The chief objection to the fineness number is that two sands of different grain distribution may have the same average fineness. Both the A.F.A. subcommittee on grading and fineness, and the Foundry Sand Committee of the N.I.S.A., are now studying the method of expressing fineness with a view to improving it.

This, incidentally, leads to what should be included under the term "fines." Although some include everything below the 100 mesh, the Committee some time ago recommended that it should include those particles of sand which are retained on the 200, 270 sieves and pan. There seems, however, to be no adherence to this rule because it is applied differently in shops making castings from different types of metal, such as gray iron, steel, malleable and non-ferrous, and also varies with the type of casting being made, whether light, medium or heavy.

Distribution Factor—Largely because the fineness number did not indicate the degree of distribution of the different-sized grains on the several sieves, and because two sands of the same average fineness might show a different distribution, the Committee was asked to develop a method for determining this feature. A large amount of time was spent by the Subcommittee on Fineness and Grading in an effort to do this. They finally developed and recommended a method which involved considerable calculation, but which has met with so much opposition that the Committee has voted to reject it, and is trying to find a simpler one.

It may be better to attempt to find a method which is extremely simple, even though it may not show a high degree of accuracy. It would seem that just plotting the fineness curve might, at a glance, give one a sufficient idea of the distribution.

The Sand Research Committee has recommended a method for making a sieve test, for calculating the average fineness and for calculating distribution. It should be understood that these are simply recommended methods for accomplishing certain things and the foundryman is at liberty to use any or all of them just as he pleases. If he feels that none of them suits his purpose, he is under no obligation to employ them. If, in using the sieve test, he wants to combine pan and A.F.A. clay, or if he wants to lump together the percentage of the grains retained on three adjacent sieves, he is also at perfect liberty to do so.

Grading — The Committee also suggested a Grain Fineness classification[1]. It was not long before one group found fault with this, claiming that certain grain classes were too broad and should be subdivided. Since it will be recognized that any other groups might make the same request, it would seem that in those cases where the grain class is too broad, the consumer might better specify the percentage of grains on certain sieves. The same might apply to the clay class.

(to be continued)

[2] Jackson, C. E. and C. M. Saeger, Jr., *"Use of the Pipette Method in the Fineness Test of Molding Sand,"* National Bureau of Standards, Research Paper 757, 1935.

[3] Wintermyer, A. M., E. A. Willis and R. C. Thoreen, Public Roads, vol. 12, No. 8, Oct. 1931.

New Members

(Concluded from Page 10)

James Jerome Hill Reference Library, St. Paul, Minn.
Chas. H. Leeder, Mgr., Leeder's, Limited, Winnipeg, Manitoba, Canada
*Newaygo Engineering Co., Newaygo, Mich. (E. N. Hanlon, Gen'l Mgr.)
William A. Pennington, Industrial Fellow, Mellon Institute, Pittsburgh, Pa.
O. B. Schultz, Chem. & Engr. of Tests, Lima Locomotive Works, Inc., Lima, Ohio
Robert M. Tyler, North Adams, Mass.
Carl H. Zwermann, Ass't Prof. Ceramic Engrg., College of Mines, University of Washington, Seattle, Wash.

Foreign

Wolfe Hoffman, Chemist, Hadfields Steel Foundry, Bassendean, West Australia
I. R. John, Metallurgist, M. B. John Pty., Ltd., Ballarat, Victoria, Australia
Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden
J. J. Sheehan, Foundry Mgr., Austin Motor Co., Ltd., Longbridge Works, Birmingham, England

Chapter Lecture Courses Aid the Man in the Shop

ONE of the most worthwhile activities which several chapters of A.F.A. are sponsoring are the annual lecture courses for shop men and apprentices. These lecture series are being held at very nominal fees for the purpose of broadening the vision and knowledge of foundry practice of those men engaged in foundries in the various chapter areas. Most of these courses cover basic subjects of general foundry practice. Others, however, are sponsored in co-operation with certain educational institutions, to produce better informed supervisors and workmen.

The Chicago chapter was the first chapter to undertake such a course and this year is holding its sixth annual foundry lecture course. The subject matter deals with such subjects as steel molding sands, manufacture and application of pattern equipment, core binders, coke, gating and risering, cupola operation, steel melting, and alloy cast iron.

The Detroit chapter is sponsoring its second lecture course. Last year, the theme of the Detroit course was "Elements of Foundry Practice." The theme of the 1941 lecture course is "The Production of Better Castings." This year's course covers gray iron, steel, malleable and non-ferrous castings and includes such subjects as cupola melting, gating, risering, cores, molding, sand, refractories, and metallurgy.

Three chapters are holding their first lecture courses. The Metropolitan chapter is dividing their series into two parts. The first section covered melting and pouring, preparation of foundry sand, types of castings as influenced by molding method, and pattern and casting design. The second section of the course will be held later and its details are not as yet known.

The St. Louis District chapter also sponsored a course for the first time this year. This course is held in co-operation with the David Rankin school and is designed primarily for foundry apprentices in the St. Louis area. The course has been so successful that many shop men have entered the course and the enrollment exceeded the fondest expectations of the committee in charge.

The Birmingham District chapter, likewise sponsoring a lecture series for the first time, has designed its course for apprentices. The Southern California chapter, last year working in co-operation with the Los Angeles school authorities, provided evening courses in one of the high schools.

Thus it can be seen that through A.F.A. chapters and their activities, much is being done to educate the man in the shop regarding the manufacture of foundry products. These chapter activities should result in better knowledge of foundry problems among shop men and smoother and better operations in the foundries themselves.

Detroit Chapter Announces Lecture Course Program

THE Detroit Chapter Educational Course Committee under the chairmanship of E. K. Smith, Electro Metallurgical Co., Detroit, has announced a series of outstanding talks at its

Detroit Chapter Educational Course Program

Date	*Subject*	*Speaker*
February 28	Melting Quality Castings by Cupola Process	H. S. Austin, Fdry. Met., Buick Motor Car Co., Flint, Mich.
March 7	Molds, Gates, Risers, Cores, etc., for Production of Better Castings	Charles Carson, Fdry. Supt., National Supply Co., Toledo, Ohio
March 14	Sand, Cores, Refractories, Particularly as They Affect Physical Properties and the Production of Better Castings	Harry Dietert, Pres., Harry W. Dietert Co., Detroit, Mich.
March 21	Production of Steel Castings	R. J. Wilcox, Met., Michigan Steel Casting Co., Detroit, Mich.
	Production of Malleable Castings	Carl Joseph, Met., Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.
March 28	Metallurgy of Ferrous Metals	A. L. Boegehold, Chief Met., General Motors Research Labs., Detroit, Mich.
April 4	Quality Aluminum Castings	H. J. Rowe, Met. Engr., Aluminum Co. of America, Cleveland, Ohio.
	Quality Magnesium Castings	Les Brown, Plant Mgr., Magnesium Fabricators, Adrian, Mich.

annual lecture course to be held during February, March and April. The committee also has announced that the theme of this year's lecture course will be "The Production of Better Castings." The 1941 lecture course is designed as a followup of last year's course which covered elements of foundry practice. In the box on page 14 will be found the dates, subjects and speakers at the six lectures which constitute the 1941 program.

A partial list of the membership of the Detroit Chapter Educational Course Committee follows:

E. K. Smith, Electro Metallurgical Co., *Chairman.*
V. A. Crosby, Climax Molybdenum Co.
A. L. Boegehold, General Motors Research Laboratories, Detroit.
E. J. Ash, University of Michigan, Ann Arbor.
F. J. Walls, International Nickel Co.
A. H. Allen, Penton Publishing Co.
O. F. Carpenter, Packard Motor Co.
A. J. Gonter, Chrysler Corp., Dodge Foundry.
E. C. Jeter, Ford Motor Co.
W. B. McFerrin, Cadillac Motor Co.
O. Sundstedt, General Foundry & Machine Co., Flint.
R. J. Wilcox, Michigan Steel Casting Co.
H. W. Dietert, Harry W. Dietert Co.
E. J. Burke, Hickman, Williams & Co.
W. Larson, Cass Technical High School.

Chicago Chapter Begins Annual Lecture Course

ON January 6, the Chicago Chapter held the first session of its 1941 Foundry Lecture Course. This is the sixth such course presented by the Chicago Chapter and is offered primarily for operating foundrymen, apprentices and students. The course consists of nine lectures divided into two groups. One group is devoted to gray and malleable irons and the other to steel. These meetings are held on alternate Monday evenings in the auditorium of the Peoples Gas Light & Coke Co., 122 S. Michigan Ave., Chicago, throughout January, February and March, when regular chapter meetings are not held.

The January 6 lecture was given by Prof. L. J. Haga, Lewis Institute Division, Illinois Institute of Technology, Chicago, on "Metallography of Cast Metals." Prof. Haga's excellent lecture pointed out the differences not only in properties but in the structures of various types of cast ferrous metals. He also explained the influence of structure on the various properties and explained how and why gray iron, malleable iron and steel differed. M. J. Lefler, Western Foundry Co., general chairman of the Chicago Chapter Lecture Course Committee, presided.

In the accompanying box will be found the dates, subjects, speakers and technical chairmen of the remaining lecture course sessions. Personnel of the Chicago Chapter Lecture Course Committee is as follows:

M. J. Lefler, Western Foundry Co., Chicago, *General Chairman.*
M. E. Johnson, Whiting Corp., Harvey, *Secretary.*
L. F. Lottier, Peoples Gas Light & Coke Co., Chicago, *Chairman, Iron Group.*
A. G. Gierach, American Manganese Steel Co., Chicago Heights, *Chairman, Steel Group.*
H. K. Briggs, Miller & Co., Chicago.
Lawrence Hahn, Sivyer Steel Castings Co., Chicago.
C. G. Mate, Greenlee Foundry Co., Chicago.
R. A. Lindgren, Wisconsin Steel Co., Chicago.
L. H. Hartwig, Chicago Malleable Castings Co., Chicago.
H. M. St. John, Crane Co., Chicago.
Martin Rintz, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Chicago Chapter Lecture Course Program

Date	*Subject*	*Speaker*	*Technical Chairman*
January 20	Steel Molding Sands	W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.	B. J. Aamodt, National Malleable & Steel Castings Co., Chicago, Ill.
January 27	The Manufacture and Application of Pattern Equipment	E. J. Brady, Western Foundry Co., Chicago, Ill.	H. K. Briggs, Miller & Co., Chicago, Ill.
February 3	Core Binders and Core Washes	J. A. Gitzen, Delta Oil Products Co., Milwaukee, Wis.	H. E. Orr, Burnside Steel Foundry Co., Chicago, Ill.
February 17	Foundry Coke—Its Manufacture and Use	B. P. Mulcahy, Citizens Gas & Coke Utilities, Indianapolis, Ind.	F. E. Fisher, Sloss-Sheffield Steel & Iron Co., Chicago, Ill.
March 3	Cupola Operation	W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee, Wis.	G. P. Phillips, International Harvester Co., Chicago, Ill.
March 24	Gating and Risering	Edwin Johnson, Continental Roll & Steel Foundry Co., East Chicago, Ind.	B. J. Aamodt, National Malleable & Steel Castings Co., Chicago, Ill.
March 31	Alloy Cast Iron	T. E. Barlow, Vanadium Corp of America, Detroit, Mich.	H. W. Johnson, Northwestern Foundry Co., Chicago, Ill.
April 7	Steel Melting	H. B. Schulz, Carnegie-Illinois Steel Corp., Chicago, Ill.	A. G. Gierach, American Manganese Steel Co., Chicago Heights, Ill.

Turnout of St. Louis foundrymen to hear N. L. Pinkert, Carondelet Foundry Co., talk on sand testing at chapter lecture course meeting.
(Photo courtesy Robert Jacoby, Key Co.)

J. D. Burlie, Western Electric Co., Chicago.
L. H. Rudesill, Griffin Wheel Co., Chicago.
B. J. Aamodt, National Malleable & Steel Castings Co., Chicago.
Paul Skirha, Crane Co., Chicago.

Birmingham District Chapter to Conduct Eight Lectures for Apprentice

THE Birmingham District Chapter has organized a training course for apprentices and young men of the foundry industry in the Birmingham district. The course will consist of a series of eight lectures during the months of January, February, March and April, two sessions being conducted each month. All meetings will be held in the Tutwiler Hotel, Birmingham, from 7:30 to 9:00 P.M. Dates on which lectures are scheduled are: January 10, 24, February 7, 21, March 7, 28 and April 11, 25.

The committee of the Birmingham District Chapter which has made arrangements for the meetings is as follows: R. L. Ogden, Stockham Pipe Fittings Co., *Chairman;* Carson Adams, Adams, Rowe & Norman; Gordon Jones, U. S. Pipe & Foundry Co.; W. E. Curran, Republic Steel Corp., and J. A. Bowers, American Cast Iron Pipe Co.

The training course will consist of a series of talks with explanatory devices, moving pictures, slides, etc., something that young foundrymen will enjoy and from which they will receive value. Inspection trips to various furnaces, foundries and other places of interest also will be held. The first of these tours will be through one of the blast furnaces in the district. Speakers will be selected for their particular experience and for the practical information which they can bring to those attending the course.

The first meeting of the Birmingham District Chapter Apprentice Training Course was held January 10 at the Tutwiler Hotel, Birmingham, with an attendance of 162. L. N. Shannon, A.F.A. President and Vice President, Stockham Pipe Fittings Co., Birmingham, who was to deliver the first lecture, unfortunately became ill and Carson Adams took his place on the speakers' platform. Mr. Adams discussed the history of molding from ancient to modern times. R. L. Ogden, Chairman of the Apprentice Training Committee, presided at the meeting.

The second meeting scheduled for January 24 will hear J. A. Bowers, in charge of cupola melting, American Cast Iron Pipe Co., Birmingham, speak on "Modern Cupola Practice." Subjects for future lectures will be announced later.

Junior Foundrymen of America Dine

THE Crane chapter of the Junior Foundrymen of America, which is composed of Smith-Hughes students at Crane Technical High School, Chicago, Crane graduates in foundry practice, and apprentices, held a dinner on January 16 at Little Jack's Restaurant. The dinner was held to honor the mid-semester graduating class. G. A. Davis, instructor in foundry practice at Crane, who has been the boys' mentor during their two years intensive training in foundry practice, Mr. Webster, principal of Crane Technical High School, R. E. Kennedy, secretary, and N. F. Hindle, assistant secretary, respectively of the American Foundrymen's Association, gave short talks to the boys advising them of the opportunities awaiting them in the foundry industry.

The main speaker of the evening was A. L. Armantrout, Superintendent of Industrial Relations, Carnegie-Illinois Steel Corp., Chicago, who gave an inspirational type of talk which centered around the attitude that the graduates should adopt in applying for positions and especially with regard to filling out questionnaires for employment. Mr. Armantrout was accompanied by V. G. Cornelius of the same corporation. Mr. Armantrout was introduced by Paul Gumz, retiring president of the Junior Foundrymen.

Following various talks, the new officers were inducted into office and the meeting was turned over to R. Bongeorno, the new president.

The list of graduates is as follows: Paul Gumz, Arthur Quesnell, Alfred Reporto, Ernest Srail, Carl Alston and Walter Golasky.

Connecticut Non-Ferrous Men Elect Officers

THE Connecticut Non-Ferrous Foundrymen's Association recently released the names of their officers who were elected for 1941. Association president is D. Wesley Case; vice president, Ernest F. Stone; treasurer, Walter J. Kenney; secretary, Louis G. Tarantino; and technical-secretary, Frank B. Diana.

The executive committee is composed of the following men: *chairman,* Howard A. Phelps; T. Joseph Judge; George S. King; S. W. Chappell; and Fred B. Clark.

Regional Meetings

Wisconsin Chapter Sponsors Fourth Annual Regional Conference

THE Fourth Annual Regional Conference sponsored by the Wisconsin Chapter in cooperation with the College of Engineering, University of Wisconsin, Madison, Wis., will be held at the Schroeder Hotel, Milwaukee, Thursday and Friday, February 20 and 21.

The program is one of exceptional interest to foundrymen covering various phases of the production of gray iron, steel, malleable and non-ferrous castings. The program is divided into sections with each section having a leader and each session being provided with discussion leaders of well-known ability.

In addition to the various sessions devoted to specific subjects, six joint meetings are planned at which outstanding speakers, some of national prominence, will address the entire group. In addition to the opening session scheduled for 10:00 a.m., Thursday, February 20, which will be addressed by F. Ellis Johnson, Dean, College of Engineering, University of Wisconsin, Madison, Wis., at which B. D. Claffey, General Malleable Corp., Waukesha, Wis., Wisconsin chapter chairman, will preside, three other joint sessions are planned for the first day and two on Friday. At the luncheon on Thursday, Mayor Carl Zeidler, Milwaukee, Wis., will speak on "Industrial Development." A. C. Ziebell, Universal Foundry Co., Oshkosh, will preside. At the 3:30 p.m. joint meeting, Victor L. Short, President, Institute of Human Science, will speak on "The Human Element Factor in Business." Chapter Chairman Claffey will preside.

The conference dinner to be held at 6:30 p. m., Crystal Ballroom, Hotel Schroeder, will feature the Hon. Martin Dies, Member of Congress, Chairman of Un-American Activities Committee, as the speaker. Congressman Dies will discuss "Subversive Activities."

The luncheon on Friday will be addressed by Gen. N. F. Ramsey, Rock Island Arsenal, Rock Island, Ill., who will speak on "The Rock Island Arsenal." Prof. J. F. Oesterle, University of Wisconsin, will preside. The final session on Friday also will be a joint session and will begin at 3:30 p.m. L. V. Boardman, Special Agent in Charge, Federal Bureau of Investigation, Milwaukee, will discuss "Plant Preparedness for Possible Sabotage Prevention." George Dreher, Ampco Metal, Inc., Milwaukee, will preside.

The accompanying box shows the schedule of sessions devoted to foundry practice.

To make the sessions more interesting, questionnaires on foundry practice were distributed at the November and January meetings of the chapter. Answers to the problems brought forth in these questionnaires will be given at various points and at various sessions during the program. This feature should add much to the interest of the conference.

The following is a list of the committees together with their personnel which have been responsible for staging the regional conference:

Executive Committee

A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis.
Prof. J. F. Oesterle, University of Wisconsin, Madison.
B. D. Claffey, General Malleable Corp., Waukesha.

Secretary

David Zuege, Sivyer Steel Casting Co., Milwaukee.

Treasurer

R. F. Jordan, Sterling Wheelbarrow Co., Milwaukee.

Sectional Committees

Gray Iron

Harry Ladwig, Allis-Chalmers Mfg. Co., West Allis, Wis., *Chairman.*
H. C. Waldron, Nordberg Manufacturing Co., Milwaukee.
William Hambley, Allis-Chalmers Mfg. Co., West Allis.

Malleable

Chas. Gutenkunst, Milwaukee Malleable and Grey Iron Works, Milwaukee, *Chairman.*
Prof. J. F. Oesterle, University of Wisconsin, Madison.
W. J. MacNeill, Federal Malleable Co., West Allis.
Ray Flansburg, Belle City Malleable Iron Co., Racine.
Macleod Lewis, Badger Malleable & Manufacturing Co., South Milwaukee.

Steel

Paul Power, Maynard Electric Steel Casting Co., Milwaukee, *Chairman.*
Fred Pritzlaff, Falk Corp., Wauwatosa.
David Zuege, Sivyer Steel Casting Co., Milwaukee.
James Ewens, Milwaukee Steel Foundry Co., Milwaukee.

Non-Ferrous

Walter Edens, Ampco Metal, Inc., Milwaukee, *Chairman.*
D. E. Stephens, The Kramer Co., Chicago, Ill. (Milwaukee)
A. K. Higgins, Allis-Chalmers Mfg. Co., West Allis.
L. A. Pankratz, Quality Aluminum Co., Waukesha.

Speakers for Luncheon and Joint Meetings

George Dreher, Ampco Metal, Inc., Milwaukee.

Schedule of Sessions—Wisconsin Regional Conference
Hotel Schroeder, Milwaukee, February 20 and 21

Steel

Thursday, February 20

10:45 to 12:00 A.M.	Flowability of Cast Steel	Dr. C. H. Lorig, Battelle Memorial Inst., Columbus, Ohio
1:45 to 3:20 P.M.	Controlled Directional Solidification in Steel Castings	S. W. Brinson, Norfolk Navy Yard, Norfolk, Va.

Friday, February 21

9:00 to 10:15 A.M.	Heading & Gating	H. A. Forsberg, Continental Roll & Steel Foundry Co., East Chicago, Ind.
10:30 to 12:00 A.M.	Gamma Ray Inspection of Steel Castings	Dr. Gilbert E. Doan, Lehigh University, Bethlehem, Pa.
1:45 to 3:20 P.M.	Foundry Maintenance	James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Malleable

Thursday, February 20

10:45 to 12:00 A.M.	Efficient Malleable Melting Practice	P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill.
1:45 to 3:20 P.M.	Foundry Sand	Bert Stone, Belle City Malleable Iron Co., Racine, Wis.

Friday, February 21

9:00 to 10:15 A.M.	Scrap Clinic *Board of Experts* E. P. Meyer, Chain Belt Co., Milwaukee. Fred Voelkel, Federal Malleable Co., West Allis. M. H. Weaver, General Malleable Corp., Waukesha. V. F. Gapinski, Milwaukee Malleable & Grey Iron Works, Milwaukee. P. J. Stoesser, Badger Malleable Co., South Milwaukee. R. J. Anderson, Belle City Malleable Iron Co., Racine. Wm. Hoernke, Wisconsin Appleton Co., South Milwaukee. M. A. Harder, Lakeside Malleable Casting Co., Racine.	
10:30 to 12:00 A.M.	Scrap Clinic continued.	
1:45 to 3:20 P.M.	The Selection of Molding & Coremaking Equipment for Economical Production	W. R. Jennings, John Deere Tractor Co., Waterloo, Iowa.

Non-Ferrous

Thursday, February 20

10:45 to 12:00 A.M.	Navy, Federal & Air Corps Specifications	Lt. H. M. Marshall, Res. Insp., Nicholas Elliot, Civ. Res. Insp., Milwaukee Navy Inspection Office
	Ordnance Inspection	Paul Cunnick and H. A. Curtis, Rock Island Arsenal, Rock Island, Ill.
1:45 to 3:20 P.M.	Metallurgy of Aluminum Alloys & Castings	G. H. Starmann, Apex Smelting Co., Chicago, Ill.

Friday, February 21

9:00 to 10:15 A.M.	Crucible Melting	D. B. Milward, Electro Refractories & Alloys Corp., Buffalo, N. Y.
10:30 to 12:00 A.M.	Non-Ferrous Foundry Cost Systems	R. L. Lee, Liberty Foundry, Inc., Wauwatosa, Wis. *Member of A.F.A. Cost Committee*
1:45 to 3:20 P.M.	Top Pouring Methods for Some Non-Ferrous Alloys	A. K. Higgins, Allis-Chalmers Mfg. Co., West Allis, Wis.

Gray Iron

Thursday, February 20

10:45 to 12:00 A.M.	Production & Job Patterns	Vaughan Reid, City Pattern Works, Detroit, Mich.
1:45 to 3:20 P.M.	Characteristics of Binders in Various Core Sands	J. A. Gitzen, Delta Oil Products Co., Milwaukee, Wis.

Friday, February 21

9:00 to 10:15 A.M.	Methods of Production & Jobbing Molding	Anthony Lebesch, Allis-Chalmers Mfg. Co., West Allis, Wis.
10:30 to 12:00 A.M.	Melting Practice for Jobbing & Production	Wm. Brooks, Allis-Chalmers Mfg. Co., West Allis, Wis.
1:45 to 3:20 P.M.	Methods in Cleaning Room Inspection	John Harris, Spring City Foundry Co., Waukesha, Wis.
	Methods of Salvaging Castings	Herb Quartz, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Publicity—Magazines and Newspapers
George Pendergast, Geo. M. Pendergast Co., Milwaukee.

Advertising
Executive Committee.

Tickets
Entire Committee.

Arrangements
Roy Jacobs, Standard Brass Works, Milwaukee.

Registration
Wm. J. MacNeill, Federal Malleable Co., West Allis.

Head Table Management
Walter Gerlinger, Walter Gerlinger, Inc., Milwaukee.

Entertainment
Ben Claffey, General Malleable Corp., Waukesha.

On General Committee
T. E. Ward, Badger Malleable & Mfg. Co., South Milwaukee.
John Bing, A. P. Green Fire

Brick Co., Milwaukee, Wis.
Prof. E. R. Shorey, University of Wisconsin, Madison.

Harry Donald, Interstate Supply & Equipment Co., Milwaukee.

Birmingham District Chapter Sponsors Ninth Annual Foundry Conference

THE Birmingham District chapter has announced a tentative program for its Ninth Annual Foundry Practice Conference to be held in the Tutwiler Hotel, Birmingham, February 27-28, March 1. This year's conference makes the Birmingham District chapter the sponsor of the oldest and most often held regional conference among the chapters of A.F.A. Each year the Birmingham District chapter does an outstanding piece of work in creating the program for its conference. It has built up an enviable reputation and this conference now is recognized as the largest group activity among southern foundrymen. Noted for their fine hospitality, members of the Birmingham District chapter outdo themselves for this particular event each year. The results are indicated by the large attendance, between 700 and 800, which have become common for these conferences over the past years. The chapter looks forward to even a larger attendance this year. In the accompanying box will be found the tentative program for the conference.

Following is a list of the committees and their personnel responsible for staging the conference this year:

Program Committee

J. E. Reynolds, U. S. Pipe & Fdry. Co., *Chairman*
A. W. Peterson, The Barrett Co., *Vice Chairman*
M. L. Carl, Sloss-Sheffield Steel & Iron Co.
J. F. Curry, A B C Coal & Coke Co.

Birmingham District Chapter

Ninth Annual Foundry Practice Conference
Tutwiler Hotel, Birmingham, Ala., Feb. 27-28, March 1

Thursday, February 27

	Subject	*Speaker*	*Technical Chairman*
9:00 A. M.	Registration—Lobby, Tutwiler Hotel		
10:30 A. M.	"Foundry Problems"	John A. Moore, Fdry. Supt., M. & H. Valve & Fittings Co., Anniston, Ala.	C. A. Jones, Fdry. Supt., Walworth Co., Attalla, Ala.
12:30 P. M.	Luncheon		*Presiding:* J. A. Bowers, Melt. Supt., American Cast Iron Pipe Co.
	"What the Association Is Doing for the Industry"	R. E. Kennedy, Secy., American Foundrymen's Ass'n, Inc. Chicago, Ill.	
2:30 P. M.	"Cast Iron in the Automotive Foundry"	Garnett P. Phillips, Met., Automotive Foundry Div., International Harvester Co., Chicago, Ill.	W. E. "Ned" Jones, Stockham Pipe Fittings Co.
4:00 P. M.	"Carbon in Cast Iron"	C. H. Lorig, Met., Battelle Memorial Inst., Columbus, Ohio	Ray L. Farabee, Prof. Met. Engrg., Univ. of Alabama, University, Ala.
7:30 P. M.	Entertainment		*Presiding:* Joe T. Gilbert, Supt., Malleable Foundry, Stockham Pipe Fittings Co.
	Features: Floor Show—Attendance Prize Drawing		

Friday, February 28

9:00 A. M.	Plant Visitation Co-Chairmen: A. S. Holberg, Alabama Clay Products I. G. Mouat, Whiting Corp.		Arrangements for visits to plants will be made at the Registration Desk, Lobby, Tutwiler Hotel
2:00 P. M.	"The Place of the Foreman in National Defense"	Leslie E. Sanders, Dir., Public Relations, National Foreman's Inst., Inc., Deep River, Conn.	R. H. Mattison, Head, Melting Dept., McWane Cast Iron Pipe Co.
3:30 P. M.	"Alloying Effects of Copper Additions to Cast Iron"	J. E. Jackson, Met., Copper, Iron & Steel Development Assn., Cleveland, Ohio	J. T. MacKenzie, Met., American Cast Iron Pipe Co.
7:00 P. M.	Annual Banquet		*Presiding:* W. O. McMahon, Chief Fdry. Met. Sloss-Sheffield Steel & Iron Co. *Toastmaster:* Warren E. Whitney, Mgr., National Cast Iron Pipe Co., Div. of James B. Clow & Sons
	"What Lies Ahead for America"	Guest Speaker: (An outstanding American . . . not yet selected)	

Saturday, March 1

9:00 A. M.	Plant Visitation		

R. L. Farabee, University of Alabama, University, Ala.
C. S. Whittet, National Cast Iron Pipe Co.
W. Joe Moore, American Cast Iron Pipe Co.
Ernst H. Buck, McWane Cast Iron Pipe Co.

Entertainment Committee

Joe T. Gilbert, Stockham Pipe Fittings Co., *Chairman*
Wayne B. Nelson, Young & Vann Supply Co., *Co-chairman*
W. J. Bach, Foundry Service Co.
W. Guy Bagley, Republic Steel Corp.
R. A. Donaldson, Woodward Iron Co., Woodward, Ala.
J. A. Woody, American Cast Iron Pipe Co.
T. H. Benners, Jr., T. H. Benners & Co.
C. B. Saunders, Tenn. Coal, Iron & R. R. Co.
C. A. Hamilton, Jr., Alabama Pipe Co., Anniston, Ala.
W. J. Bullock, P. O. Box 662, Birmingham
J. S. Bridges, U. S. Pipe & Fdry. Co., No. Birmingham.

Registration Committee

George M. Hayes, Central Foundry Co., Holt, Ala., *Chairman*
Fred K. Brown, Adams, Rowe & Norman, *Co-Chairman*
Farrar Hill, Hill & Griffith Co.
Robert P. Jones, McWane Cast Iron Pipe Co.
Ben Spann, National Cast Iron Pipe Co.
P. W. Townes, American Cast Iron Pipe Co.
Herman A. Whisenant, Underwriters Laboratories, Inc., Bessemer, Ala.

Publicity Committee

Jack Hayes, 1001 S. 22nd St., *Chairman*
H. G. Mouat, 830 Martin Bldg., *Co-Chairman*
Gale R. Irvin, Republic Steel Corp.
Harry H. Reich, 137 Meadow Lane, Trussville, Ala.
Capt. J. E. Getzen, Birmingham District Ordnance Department

Membership Committee

A. S. Holberg, Alabama Clay Products Co., 835 Martin Bldg., *Chairman*
L. E. Greer, Thomas Foundries, Inc.
C. R. Tinsley, U. S. Pipe & Fdry. Co., Bessemer, Ala.
Geo. F. Vann, American Cast Iron Pipe Co.
R. B. Galloway, Walworth Co., Attalla, Ala.
Clyde E. Hagler, Continental Gin Co.
George B. Akeroyd, National Cast Iron Pipe Co.
Morris Hawkins, Stockham Pipe Fittings Co.
Herman Mattison, McWane Cast Iron Pipe Co.
Victor A. Szwed, U. S. Pipe & Foundry Co.

New Englanders to Hold Conference in March

By M. A. Hosmer*, Boston, Mass.

FRIDAY and Saturday, March 28 and 29, have been set aside by the New England Foundrymen's Association as the days for staging their fifth annual foundry conference. The two-day meeting will convene at the Massachusetts Institute of Technology, Cambridge, Mass.

Fifth New England Regional Foundry Conference

Massachusetts Institute of Technology, Cambridge, Mass.

* * *

Tentative Program

Friday, March 28, 1941

9:00 A.M. Registration.
10:15 A.M. Opening Addresses
10:30 A.M. Job Evaluation
12:30 P.M. Luncheon
2:00 P.M. Aluminum Castings
3:30 P.M. "Casting Design"
6:00 P.M. Conference Dinner

Saturday, March 29, 1941

9:00 A.M. Registration
10:00 A.M. "Foundry Sands"
12:30 P.M. Luncheon
2:00 P.M. Non-ferrous Session
3:30 P.M. Rigging for Foundry Production
5:00 P.M. Adjournment

The tentative program and schedule of events have been arranged and are shown in the accompanying box.

Although speakers have not as yet been obtained for all the sessions, the committee is enthusiastic over the prospects of one of the largest groups ever to attend a New England Foundry Conference.

Chairman of the Association's fifth foundry conference committee is A. S. Wright, Hunt-Spiller Mfg. Corp., South Boston, Mass. He is ably assisted by Vice Chairman Walter M. Saunders, Jr., Providence, R. I. Others who are aiding in making the program and conference a success are: James D. Coltman, Bullard Machine Co., Bridgeport, Conn.; Frank Eliott, Westinghouse Electric & Mfg. Co., Springfield, Mass.; E. E. Hall, Saco Lowell Shops, Biddeford, Maine; Professor P. E. Kyle, Massachusetts Institute of Technology, Cambridge, Mass.; Professor J. M. Lessells, Massachusetts Institute of Technology, Cambridge, Mass.; D. Frank O'Connor, Walworth Mfg. Co., South Boston, Mass.; Howard A. Phelps, Phelps Foundry Co., Ansonia, Conn.; LeRoy M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I.; Henry G. Stenberg, Rice Barton & Fales Co., Worcester, Mass.; and Louis G. Tarrantino, Connecticut Non-Ferrous Foundrymen's Association, Bridgeport, Conn.

*Hunt-Spiller Mfg. Co., and Reporter, New England Foundrymen's Association.

NEW CHAPTER OFFICERS

J. E. Crown, U. S. Navy Yard, Washington, D. C., Vice Chairman, Chesapeake Chapter

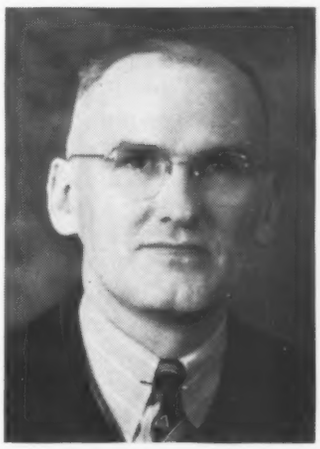
E. W. Horlebein, Gibson & Kirk Co., Baltimore, Md., Chairman, Chesapeake Chapter

L. H. Denton, Baltimore Chamber of Commerce, Baltimore, Md., Secretary-Treasurer, Chesapeake Chapter

Edwin W. Horlebein, chairman of the Chesapeake Chapter, the most recently formed chapter of the Association, is a native of Baltimore, Maryland, having been born in that city April 29, 1897. After finishing his work at the Baltimore Polytechnic High School, he served an apprenticeship in the machine department of the Baltimore & Ohio R. R. shops. On completing his apprenticeship in 1918, he went immediately into the Army serving as lieutenant in field artillery. Following the war, Mr. Horlebein was from 1918 to 1923 engineer with the Dixie Manufacturing Co. at Baltimore, leaving this position in 1923 when he was made president of Gibson & Kirk Co. of the same city. His company produces non-ferrous castings of a wide variety of special alloys.

In addition to his membership in the A.F.A., which he supports through a sustaining membership, Mr. Horlebein is a member of the American Society of Mechanical Engineers, American Society for Metals, American Society for Testing Materials, American Institute of Mining & Metallurgical Engineers, National Founders Association and the British Institute of Metals.

D. L. Booker, National Cast Iron Pipe Co., Birmingham, Ala., Secretary-Treasurer, Birmingham District Chapter



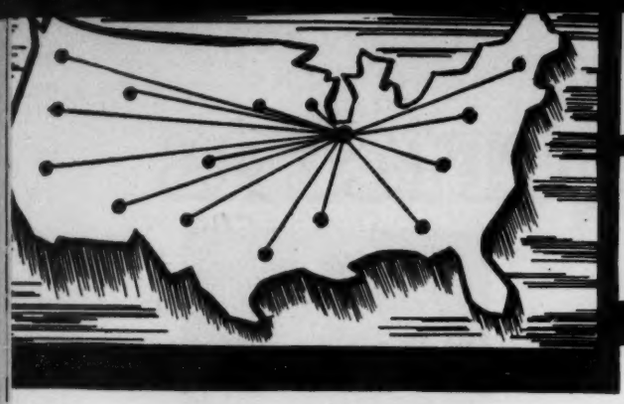
H. A. Horner, Frick Co., Waynesboro, Pa., Director, Chesapeake Chapter

H. Reitinger, U. S. Pipe & Foundry Co., Burlington, N. J., Vice Chairman, Philadelphia Chapter

R. F. Jordan, Sterling Wheelbarrow Co., Milwaukee, Wis., Treasurer, Wisconsin Chapter

W. C. Hartmann, Bethlehem Steel Co., Bethlehem, Pa., Past Chairman and Director, Philadelphia Chapter

Howard Waldron, Nordberg Mfg. Co., Milwaukee, Wis., Secretary, Wisconsin Chapter



Chapter Activities

Southern California Holds Party and Plans Conference

By W. F. Haggman,* Huntington Park, Calif.

THE Southern California chapter's fourth annual Christmas Hi-Jinks was held Friday evening, December 13, 1940, at the Lakewood Country Club with more than 300 members and guests present.

Buffet dinner was served and everybody enjoyed the festivities and good food. After the "eats" came a very fine vaudeville show, which presented some of Hollywood's best talent.

The entertainment committee, headed by Chairman Dick Hughes, Pacific Metals Co., Ltd., did a very fine job putting on this successful party.

The November 19 meeting of the chapter, in the Hotel Hayward, where 90 members had gathered to hear Victor J. Hydar, industrial relations staff, Lockheed Aircraft Corp., Alhambra, Calif., was presided over by Chapter Chairman James E. Eppley, Kinney Iron Works. Mr. Hydar spoke on the all important topic "Apprentice Training."

"Sinews of Steel," a sound picture by Bethlehem Steel Co., portrayed the various phases of wire rope manufacture from the ore pile to the finished product.

A Pacific coast regional meeting for foundrymen to be held during the Western Metals Congress when it meets in Los Angeles, May 12, is being worked out in detail between the Southern California chapter, A.F.A., and the A.S.M.

Any eastern speakers on foundry topics desiring to talk before the foundry groups of this regional meeting should write to Robert Gregg, Reliance Regulator Co., Alhambra, Calif., or to W. F. Haggman, Foundry Specialties Co., Box 615, Huntington Park, Calif.

The following committee was appointed by Chapter Chairman Eppley to work out and plan the conference:

Chairman, Robert Gregg, Reliance Regulator Co.

Chairman A.S.M., A. G. Zima, International Nickel Company.

Don Clark, California Institute of Technology.

B. G. Emmett, Los Angeles Steel Casting Co.

W. D. Bailey, Jr., Pacific Metals Co., Ltd.

W. F. Haggman, Foundry Specialties Co.

*Foundry Specialties Co., and Secretary, Southern California chapter.

West Michigan Foundrymen to Hold Meeting in Muskegon

FOUNDRYMEN of the Western Michigan area will get together at a dinner meeting Monday evening, February 3, to hear L. P. Robinson, Werner G. Smith Co., Cleveland, and a director of the Association, speak on "Practical Core Room Methods." Mr. Robinson is noted for his ability to impress his audience with the importance of attention to details in mixes, baking practice and assembly.

This meeting at the Hotel Occidental, Muskegon, has been scheduled at the request of members of the Association in the Grand Rapids-Muskegon district in the interest of promoting a chapter which will enable the foundrymen there to hold monthly meetings.

The committee sponsoring the chapter movement, and the meeting, has the following personnel:

Chairman, Don F. Seyferth, works manager, West Michigan Steel Foundry Co.

E. W. Beach, executive assistant, Campbell, Wyant & Cannon Foundry Co.

J. O. Ostergren, president, Lakey Foundry Co.

Max Amos, metallurgist, Standard Automotive Parts Co.

Paul S. Lane, research engineer, Muskegon Piston Ring Co.

A second meeting has been arranged by the committee for the following month, this to be held March 3 with A. W. Gregg, Whiting Corp., Harvey, Ill., speaking on "Cupola Practice." At this March meeting it is expected that chapter committees may be formed and officers and directors elected for the 20th chapter of the Association.

President Shannon to Visit Several Chapters in February

THE week of February 11 to 14 has been set aside by President Shannon for visits to some of the chapters. His time will be spent in meeting the chapter members and in conferences with their Board of Directors. This program has been arranged in conformation with a policy to have one of the national officers present at some one meeting of each chapter during the year.

The schedule for the February trip of President Shannon's is as follows:

Feb. 11, Cincinnati chapter.

Feb. 12, Michiana chapter (South Bend, Ind.).

Feb. 13, Northeastern Ohio (Cleveland).

Feb. 14, Luncheon meeting with Board of Directors, Western New York chapter (Buffalo).

Feb. 14, Central New York chapter (Syracuse).

During the week of March 10 President Shannon will visit some other chapters. Vice President Simpson, having visited the Ontario, Northeastern Ohio and Wisconsin chapters, has planned to visit the Northern and Southern California chapters on a western trip the latter part of January.

Christmas Party Staged by Northeastern Ohio

By Edwin Bremer*, Cleveland, Ohio

WITH space limitations holding attendance to 900 at the sixth annual Christmas party and stag of the Northeastern Ohio chapter, the members and guests enjoyed an excellent turkey dinner and a brilliant, fast moving floor show which included headliners from the stage, radio and night clubs. The party was held in the Rainbow room of Hotel Carter, Cleveland, on December 12, and was arranged under the direction of L. P. Robinson, chairman of the entertainment committee. National officers present included C. E. Hoyt, executive vice president; H. S. Simpson, vice president, and Directors H. S. Hersey and L. P. Robinson.

Next meeting of the chapter will be held on Thursday night, January 9, and the speaker will be George S. Evans, Mathieson Alkali Co., New York, whose topic will be "Cupola Operation and Research." A feature of the meeting will be the presentation of awards by the Northeastern Ohio chapter to firms whose apprentices won recognition in the annual contest sponsored by the American Foundrymen's Association. The awards will be bronze placques produced at the Cleveland Trade School under the supervision of James Goldie and Frank Cech.

*Metallurgical Editor, "The Foundry," and Chairman, Publicity Committee, Northeastern Ohio chapter.

Toledo Members to Hear Reichert on Sand Control

MEMBERS of the Association in the Toledo, Ohio, district have planned a foundry discussion meeting for themselves and others of the industry. This meeting is to be held at Hillcrest Hotel, Toledo, Monday evening, February 17.

The speaker of the evening, William G. Reichert, metallurgist, American Brake Shoe & Foundry Co., Mahwah, N. J., will discuss practical sand control, a subject most popular with foundrymen as the need for control is becoming more and more important. Mr. Reichert a long time member of the Association's Sand Research Committee, is one of the most informative speakers on this subject, having given special attention to improving sand practices while at the Singer Manufacturing Co., and in his work with foundries associated with American Brake Shoe & Foundry Co. These include the plants of the Southern Wheel Division and the American Manganese Steel Co. This work has taken him all over the country.

The Toledo meeting is being sponsored by a local Toledo committee of which the chairman is D. E. Hensley, Supt., Toledo plant, Southern Wheel Division, A. B. S. & Fdry. Co. Associated with Mr. Hensley on this committee are:

R. L. Binney, vice president, Binney Castings Co.

C. C. Mathis, metallurgist, Hickman Williams & Co.

R. C. Clark, metallurgist, Toledo Machine & Foundry Div., E. W. Bliss Co.

L. M. Long, metallurgist, Bunting Brass & Bronze Co.

Preceding the talk by Mr. Reichert, the foundrymen of the district will gather together at a dinner at the Hillcrest Hotel.

E. K. Smith at St. Louis

By J. W. Kelin*, St. Louis, Mo.

A MOST interesting and educational talk on "Ladle Additions for Iron and Steel" was given by E. K. Smith, Electro Metallurgical Company, Detroit, Mich., at the January 9 meeting of the St. Louis District chapter. In addition to pointing out the varying results of ladle additions of certain metallic elements to iron and steel, Mr. Smith also presented a series of stereopticon slides illustrating photo-micrographs of varying grain structures.

*Federated Metals Div., A. S. & R. Co., and Secretary-Treasurer, St. Louis District chapter.

Pictures of the Quad City chapter's Christmas party. Seated around the table in the lower right hand picture are: (left to right) Nathan Lesser, Deere & Co., chairman, Quad City chapter; Herman Alex, Rock Island Arsenal, chapter chairman in 1939; Louis Desparois, Federated Metals Div., A. S. & R. Co., secretary-treasurer, St. Louis chapter; Fred Kirby, John Deere Spreader Works, past chairman and past chapter board of directors member; P. T. Bancroft, chapter board of directors member; and D. S. McDannell, Deere & Co. *(Photos courtesy Carl E. Von Luhrte, Chicago Retort & Fire Brick Co.)*

Chairman of the entertainment committee, M. A. Bell, M. A. Bell Co., reported on the successful dinner party and entertainment held during December by the chapter. L. J. Desparois, Pickands, Mather & Co., vice chairman, and program committee chairman, directed special attention to the February meeting which will be "Equipment Night," and under the direction of the various equipment and supply men of the chapter. Final committee report, given by Carl Morken, Carondelet Foundry Co., reminded all of the resuming of the Foundry Practice School sessions on January 15. It also was announced that four additional lectures would be given.

Further announcement was made of intentions to prepare a March extension meeting in Kansas City to be worked out in collaboration with A. O. Nilles, Griffin Wheel Co., Kansas City.

Ontario Chapter Holds Group Meetings

By G. L. White*, Toronto, Ont.

IN spite of bad weather conditions, about 80 were in attendance at the November 29 Ontario chapter meeting at Rock Garden Lodge, Hamilton. Chapter Chairman D. M. Storie, Fittings, Ltd., Oshawa, Ont., had charge of the monthly meeting.

Following the dinner the members and guests split up into three groups, gray iron, malleable and non-ferrous, to discuss the various foundry problems.

The non-ferrous group under the guidance of Joseph Sully, Sully Brass Foundry, Ltd., Toronto, discussed several important themes. In regard to furnaces or melting units, it was the feeling that conditions and quantity of metal required, fuel available, and parts being made, all had a bearing on the selection of a melting procedure, and that almost any type could provide good metal if properly controlled. In regard to moisture content of sand, the conclusion was that an average somewhere in the range of 4 to 6 per cent was normal, and that class of sand, type, and weight of castings, etc., had some bearing on the moisture that could be safely allowed. Materials in which extra interest has been aroused by war requirements which were discussed, included manganese bronze of 100,000 to 110,000 lb. tensile strength, with 12 per cent elongation, and an aluminum alloy, containing zinc and copper, in which close control is required in meeting specifications. Pyrometers, chaplets, and chill or chaplet coatings, were other items which came under discussion.

The malleable iron section, which was arranged by T. A. Rice, International Harvester Co. of Canada, Ltd., Hamilton, was under the leadership of H. F. Davis, metallurgist, International Harvester Co. of Canada, Ltd. Mr. Davis gave a detailed discussion of a new type of malleable introduced from England to meet the requirements of certain specifications. The principal feature of this type of malleable is the combination of the usual ductility with a very hard surface. Melting methods are similar to normal malleable iron and the unusual hardness is attained by subsequent treatments.

Joint leaders of the gray iron group, O. W. Ellis, Ontario Research Foundation, and J. C. Stavert, metallurgist, Babcock-Wilcox-Goldie-McCulloch, Ltd., gave short talks which were followed by interesting discussions.

Mr. Ellis dealt with the production of small wire grips with which some trouble had been encountered. At the Ontario Research Foundation it was noticed that a 3 per cent carbon, 1¼ per cent silicon, 6 per cent manganese iron possessed a structure which might be suitable for these grips. Grips of this material will give slightly, but their teeth harden on working to grip the wire even more firmly. At first, in casting the grip from the manganese steel, difficulties were encountered with blunt teeth, and the appearance of a greenish slag. Raising the flowing temperature did not improve the situation, and finally the pouring temperature was lowered as far as possible to about 2450°F., when perfect grips were produced with sharp teeth, and the operation was free from slag. It was believed that the slagging might be due to a reaction between the manganese and silica sand at high temperature. The cost of the manganese steel grips is very favorable when compared with grips produced by machining 0.90 carbon steel, and heat treating.

In a discussion of supermachinable iron, led by J. C. Stavert, and originating out of the recent paper presented by Herbert H. Fairfield, Bureau of Mines, Ottawa, before the chapter, the question of a ferritic layer for machinablity was raised. It was pointed out that, by proper combination of cooling rate and carbon-silicon ratios, it should be possible to produce a layer high in ferrite and low in carbon. One of the suggestions was that in view of the ability of the toolmaker to make tools to operate efficiently on a wide variety of ferrous materials, it is unwise to do anything that would decrease the value of the part metallurgically until machining possibilities have been investigated.

In connection with cupola operations, J. C. Stavert pointed out that metallurgical control of the process involved the conscious effort to obtain satisfactory conditions and maintain them. The achievement of highest thermal efficiency depends to a very considerable extent upon the maintenance of proper coke-air ratios. The correct amount of air is that which burns the coke completely, plus about 10 per cent. The equations of reactions in the cupola between carbon and oxygen were set down and the discussion brought out the point that there is some variation in opinion regarding the exact sequence. The nature of the reaction in the cupola will, of course, depend to a con-

*Westman Publications, and Secretary-Treasurer, Ontario chapter.

siderable extent upon the coke-air ratio. The correct bed for the cupola should hold the melting zone at the most efficient level. In general, a 42-in. coke bed may be considered normal with increases or decreases to meet specific cupola conditions.

The question of accessory equipment for the cupola to recover waste heat is decided by proper cupola operation, for the cupola may be made so efficient that no losses occur worth equipment for recovery.

In the balanced blast cupola, an attempt has been made to secure further efficiency by the introduction of air to tuyeres further up the cupola from the normal location.

In the discussion, the efficiency of cupola operations at reduced rate received attention. In theory, efficiency would be reduced, and this may frequently work out to be true, but it was pointed out that when blast furnaces which have many similarities were cut down during the depression, they attained higher efficiency, which was contrary to all theory. Control of the cupola by continuous analysis of carbon dioxide offers an excellent method of maintaining conditions since, if the CO_2 is kept constant, almost everything in the operation will be constant.

Wisconsin Chapter Entertains Crowd at Party

By H. C. Waldron*, Milwaukee, Wis.

CAME the evening of Friday, December 20, and 602 members and guests crowded into the Schroeder Hotel, Milwaukee, to relax and enjoy one of the biggest parties put on by the Wisconsin chapter.

The excellent dinner and eight act floor show was enjoyed to the fullest extent by the record breaking gathering. Among those attending were C. E. Hoyt, A.F.A. executive vice president; H. S. Simpson, national vice president, and E. O. Jones, A.F.A. director of safety and hygiene.

The members and guests enjoyed themselves so thoroughly that the entertainment committee was congratulated over and over again on a job well done. The committee consisted of: Arthur Haack, Wisconsin Gray Iron Foundry, *chairman;* E. N. Carpenter, Carpenter Bros., Inc.; Frank Kulka, Motor Castings Co.; S. A. Pankratz, Quality Aluminum Co.; J. G. Risney, International Molding Machine Co.; and Nels Spidell, Sand Products Corp.

C. E. Hoyt, A.F.A. executive vice president, who brought greetings from Association headquarters, and Frank G. Steinebach, editor, *The Foundry*.

Chairman Coley, Detroit-Edison Co., turned the technical meeting over to Fred J. Walls, International Nickel Co., who introduced the speaker, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va. With the aid of lantern slides, Mr. Kuniansky described some of the unusual phases of iron production in his plants, such as the casting of pipe centrifugally in steel molds, and the production of a variety of large castings for miscellaneous applications.

A feature of operations at the Lynchburg Foundry is the use of high scrap charges in the cupola because of the scarcity of pig iron, and the high freight rates on pig iron to that territory.

A lively discussion period followed the formal presentation, in which a dozen or more men participated.

*Nordberg Mfg. Co., and Secretary, Wisconsin chapter.

Kuniansky Speaks Before Detroit Chapter

By A. H. Allen*, Detroit, Mich.

THE regular January meeting of the Detroit chapter was held in the Colonial Room of the Detroit-Leland Hotel. Fifty-one were in attendance at the dinner and about ten more were on hand for the meeting which followed. Guests of the chapter included

*Detroit editor, "The Foundry," and secretary, Detroit chapter.

Some pictures of the members and guests who attended the Wisconsin chapter's Christmas party, December 20, at the Schroeder Hotel.

(Photos courtesy John Bing, A. P. Green Fire Brick Co.)

Evans Talks and Plaques Presented at Northeastern Ohio

By Pat Dwyer*, Cleveland, Ohio

THE Northeastern Ohio chapter heard George S. Evans, research metallurgist, Mathieson Alkali Works, Inc., New York, discuss many phases of cupola control and operation at its January 9 meeting, Tudor Arms, Cleveland. His talk was preceded by a clever and witty presentation of an illustrated lecture on "Cockeyed Patents I Have Known," by W. G. Soley, Carborundum Co., Niagara Falls, N. Y. Mr. Evans devoted the first part of his talk to an explanation of the functions and purpose of the recently organized cupola research committee of the A.F.A. The second part of his talk, illustrated by a number of slides, covered theory and practice of cupola operation with particular reference to fluxing and desulphurizing the metal.

Immediately after the dinner the group of boys awarded prizes in last year's A.F.A. molding and patternmaking contest were presented with bronze plaques to be set up in their respective places of employment. The bronze plaques, made at the Cleveland Trade School, bore the boy's name and the name of the firm, and were presented to John Burczky, Master Pattern Co.; William Theis, Warner & Swazey Co.; Albert Jazbinski, Western Pattern Works; Peter Palshook, Gluntz Brass Foundry; Louis Taus, Aluminum Co. of America; John Jasso, Wellman Bronze & Aluminum Co.; S. Marcysiak, West Steel Casting Co.; Robert Darmour and J. Birkenheuer, Crucible Steel Casting Co.; W. Wehagan, Atlas Foundry Co.; L. Simeon, Hill-Acme Co.; C. Blacksmith, Bowler Foundry.

Referring to the recently organized committee on cupola research, Mr. Evans touched upon conditions which led up to the formation and to the belief that a program of this kind will remove most of the mysteries from cupola control and enable foundrymen to produce consistently better castings at a reduction in cost. He instanced the remarkable results directly traceable to the sand research program initiated about 20 years ago by the A.F.A. Considerably expanded from the first conception, the program now is outlined to take five years at an estimated cost of $50,000. Work will involve review of literature, current practices, and accumulation of pertinent data from all available sources. A compiled and digested version will be published as a cupola handbook.

The speaker discussed the subject of slags and fluxes from theoretical and practical standpoints.

*Reporter, Northeastern Ohio, and Engineering Editor, "The Foundry."

Work Simplification Discussed at Chicago Meeting

By B. L. Simpson*, Chicago, Ill.

ON Monday evening, January 13, an unusually large crowd of Chicago foundrymen attended the regular meeting of the Chicago chapter held at the Chicago Towers Club.

To this large and enthusiastic gathering the program committee presented Allan H. Mogensen, industrial consultant, New York, who spoke on the subject, "Work Simplification and National Defense." Mr. Mogensen presented his ideas in a very clear and forceful manner, illustrating several of his points by means of motion pictures.

He stated that there were many obstacles in increasing productivity in any plant. Among these were: Natural resentment of criticism; not knowing how to work; and not being enthused about the job.

Mr. Mogensen addressed part of his remarks to the foundry industry and pointed out that waste time and motion in this trade was considerable. He illustrated by stating that for every pound of castings sold, the plant must handle eight hundred pounds of equipment and material. He suggested that each man present examine his own plant and productive steps with the question, "Is this necessary?" foremost in the investigation.

In this connection he stated that every job has three parts: (1) Make ready; (2) Do; (3) Clean up. All other acts are superfluous.

Foundrymen interested in work simplification should study their problems by means of close observation and then proceed to move to correct them.

Mogensen advised that all plants have the brains in their own organization to solve these problems and urged executives to encourage suggestions from employees.

Prior to Mr. Mogensen's talk, the foundrymen were entertained by a sleight of hand expert, while following the address there was a question period.

*National Engineering Co., and Secretary, Chicago chapter.

Brass Practice Talk at Metropolitan Chapter

By W. A. Phair*, New York, N. Y.

WILLIAM ROMANOFF, technical superintendent, H. Kramer & Co., Chicago, addressed the January 8 meeting of the Metropolitan chapter on "Brass Foundry Practice." The meeting was held at the Essex House, Newark, with Russell Allen, Worthington Pump & Machinery Co., Harrison, N. J., the chapter president, presiding.

Mr. Romanoff briefly discussed the manufacture of non-ferrous ingots, with particular stress on the method used for the elim-

*"Journal of Commerce," and Secretary, Metropolitan chapter.

Chapter Chairman Carter Bliss, Scullin Steel Co., (left) and M. A. Bell, M. A. Bell Co., chairman, entertainment committee, hide behind some Christmas presents left by Santa Claus for the St. Louis Chapter Christmas party.
(Photo courtesy Robert Jacoby, Key Co.)

ination or reduction to within specified limits of impurities. Examples were given to illustrate how defects which were originally blamed on the ingot metal could have been eliminated by proper foundry practice.

The special alloys, now finding wide use in defense work, were also covered. Aluminum bronze, manganese bronze, government bronze, nickel silver, nickel alloys and high lead bronze were among the alloys discussed by Mr. Romanoff. Recommendations concerning melting, pouring temperature, gating and sand conditions were given. The meeting concluded with a general discussion.

Briggs at Joint Meeting in Cincinnati

By Henry M. Wood*, Cincinnati, O.

THE Cincinnati chapter, American Foundrymen's Association, held their regular monthly meeting jointly with the American Society of Metals and the American Society of Mechanical Engineers. Chas. W. Briggs, technical advisor, Steel Founders Society of America, Cleveland, Ohio, spoke before 125 members of the societies at the Hotel Alms on the "Design of Castings."

*W. W. Sly Mfg. Co., and Secretary, Cincinnati chapter.

Following the dinner an excellent sound film, "The Power Behind the Nation," was presented through the courtesy of Norfolk & Western railroad, telling the story of production and use of coal.

St. Louis Party Attracts Many

By J. W. Kelin*, St. Louis, Mo.

THE largest attendance at any entertainment feature in the history of the St. Louis chapter was one of the many interesting factors surrounding the annual December party given Thursday evening, December 12.

Over 350 foundrymen and friends gathered round the festive board at the De Soto Hotel to enjoy an evening of fun and enjoyment. There was a fine turkey dinner served, followed by the distributing of numerous prizes under the guidance of M. A. Bell, M. A. Bell Co., chairman, entertainment committee.

There followed a most excellent variety show under the capable direction of a local master of ceremonies. A musical comedy type of entertainment was then presented.

All in all, it was the unanimous opinion of all present that it was one of the finest entertainments in the history of the chapter and much credit is to be given the entertainment committee chairman and his fine cooperating committeemen.

*Federated Metals Div., A. S. & R. Co., and Secretary-Treasurer, St. Louis District chapter.

Sand Talk at Michiana

By M. F. Surls*, Buchanan, Mich.

E. E. WOODLIFF, Harry W. Dietert Co., Detroit, Mich., discussed foundry sand at the January 7 meeting of the Michiana chapter. Some 100 members and guests were present at the meeting, over which Chapter Chairman M. F. Doty, Clark Equipment Co., Buchanan, Mich., presided.

The speaker stressed the importance of purchasing new sand and said that careful consideration should be given to the type of sand which is bought. A sand should be purchased which is suitable for the type of work being run in any particular foundry. Tests which can be run to determine suitability are grain size, clay content, durability and sintering point.

Various tests which can be made on molding sands were enumerated by the speaker. Their importance was explained. Cores

*Clark Equipment Co., and Reporter, Michiana chapter.

View of the St. Louis chapter's stag smoker and dinner held December 12.
(Photo courtesy Norman Pearsons, Miller & Co.)

were discussed in relation to types of core sands and types of binders. The talk was illustrated with slides by which the speaker ably showed the connection that exists between casting defects and the various properties of molding sand and cores as exemplified by the various standard tests.

After the speaker's discourse a lively and interesting discussion ensued.

Western New York Holds Stag Party

By Eliot Armstrong*, Buffalo, N. Y.

ON the evening of January 3 the Western New York chapter staged its annual stag party at the Trap and Field Club, Buffalo, N. Y. In keeping with the times, it was called a conscription party, and the members and guests were outfitted to belong to either the army or the navy.

All formalities were dispensed with, Chapter Chairman McCallum, McCallum-Hatch Bronze Co., turned the meeting over to the master of ceremonies at the start and the entire evening was devoted to food and fun. In addition to the two bang-up floor shows, attractive prizes were distributed by drawings held during the course of the evening.

A fine attendance of nearly 300 members and guests included those from all the neighboring cities and towns embraced in the chapter area. Messrs. Wheeler, Wright and Judson from the Central New York chapter, together with Professor Davis, Cornell University, were at the gathering to help in the fun and stimulate inter-chapter cordiality.

*Inter-Allied Foundries, and Secretary, Western New York chapter.

Gating and Risering Studied at N.I.-S.W. Meeting

GATING and risering was the subject discussed at the January 14 meeting of the Northern Illinois-Southern Wisconsin chapter held at the Faust Hotel, Rockford, Ill. E. J. Carmody, Chas. C. Kawin Co., Chicago, was the speaker. Mr. Carmody explained some of the various reasons for the multitudinous methods of gating that exist in the gray iron foundry industry and then showed some forty slides illustrating the various types of gating together with instances in which they were applied. Following the presentation, and during the showing of the slides, a constant series of questions and comments were given by the audience. The meeting was presided over by P. A. Paulson, Gunite Foundries, Inc., Rockford, chapter chairman, who announced at the close of the meeting that the next meeting would be held on February 11 and that A. L. Armantrout, superintendent of Industrial Relations, Carnegie-Illinois Steel Corp., Chicago, would speak on apprentice training.

Detroit Chapter Hears Gitzen on Core Binders

By O. E. Goudy*, Detroit, Mich.

THE Detroit chapter held its regular monthly meeting at the Detroit-Leland Hotel on Thursday, November 14, with some 100 members and guests in attendance. Chapter Chairman Glenn Coley, Detroit Edison Co., presided over the evening affair.

The technical talk of the program was delivered by J. A. Gitzen, president, Delta Oil Products Co., Milwaukee, Wis. He chose as his subject "Characteristics and Uses of Core Binders and Washes."

After covering somewhat the history of cereal and resinous binders, he mentioned their particular properties, uses and advantages for certain types of cores. Mr. Gitzen spoke of the uses and properties of perilla, linseed and soya bean oil, pointing out, also, how the effect of import taxes has limited the use of perilla and linseed oils. Thereby, this has caused the use of soya bean and polymerized mineral oils to be greatly increased.

Each of the various oils or mixtures may have its advantages or disadvantages, but the speaker believes that any of the binders should be purchased on a specification.

At the conclusion of Mr. Gitzen's talk, he answered many questions relative to oven design, air circulation and many other queries concerning core binders and washes. One of the most interesting questions dealt with the use of iron ore in core sands to overcome veining.

*Kelsey Hayes Wheel Co., and Reporter, Detroit chapter.

Northern California Holds Plant Visitation Meeting

By Geo. L. Kennard*, San Francisco, Calif.

A LARGE group of Northern California chapter members gathered at the Vulcan plant Friday afternoon, January 10, for a plant visitation and a variety meeting in the evening.

Following the evening dinner the members discussed current affairs of particular interest. During the course of the evening's proceedings E. W. Bonstin, vice president, Pacific National Fire Insurance Co., gave a half hour demonstration of his ability to memorize.

J. W. Knappe, sales manager, Modern Equipment Co., showed a sound film on the use of many interesting labor saving devices; following this showing of the film there was a question and answer period.

*Northern California Foundrymen's Institute, and Secretary-Treasurer, Northern California chapter.

Wanted—Back Volumes of Transactions

THE Association is interested in securing copies of Bound Volume Transactions, Vols. 31, 32—Part 1, 34, 35, 38, 39 and 40. It frequently has requests for these volumes which now are out of print. Members having copies of these volumes and who wish to dispose of them should address the Secretary, American Foundrymen's Association, 222 W. Adams St., Chicago, Ill.

Modrall Discusses Merit Rating at Central Indiana

By R. A. Thompson*, Indianapolis, Ind.

ONE of the largest gatherings in the history of the Central Indiana chapter was on hand to hear John F. Modrall, employment assistant, Eli Lilly & Co., Indianapolis, Ind., talk on merit rating. Chapter Chairman I. R. Wagner, Electric Steel Castings Co., was in charge of the meeting.

The members who had gathered at the Washington Hotel, January 6, were quite enthused by Mr. Modall's presentation. They believed the speaker gave a very vivid and understandable picture concerning this subject. His explanations were clear and concise and covered the topic quite thoroughly. He fully described previous experiences with this problem, as his company has worked with some type of merit rating system at various intervals since 1925. They now have a system worked out and which was developed through the aid of department heads, using a practical and simple method of determining various factors.

The speaker also used three charts to support his talk and he explained the facts contained on each one.

A very interesting and valuable discussion period followed the talk and questions requiring more detailed explanations were referred to E. H. Adriance, assistant to the director of the efficiency division, Eli Lilly & Co.

*Electric Steel Castings Co., and Secretary, Central Indiana chapter.

Industrial Nurses to Meet in Milwaukee

THE coming symposium on Industrial Public Health Nursing Services will be held at the Hotel Wisconsin, Milwaukee, February 20, 21 and 22, 1941. This symposium is sponsored by the State Board of Health and the industrial nurses of Wisconsin. For further information write to Paul A. Brehm, M.D., chairman; Industrial Nursing Symposium; Industrial Hygiene Unit; 349 State Office Building, Madison, Wis.

Officers Elected by New England Founders

By M. A. Hosmer*, Boston, Mass.

THE monthly meeting of the New England Foundrymen's Association was held Wednesday, January 8, at the Hotel Gardner, Boston, Mass., with about 200 members and guests present.

President Frances Lebaron, E. L. Le Baron Foundry Co., presided at the meeting and received the following list of officers as nominated by the committee. Officers were elected unanimously for the ensuing year:

President — Charles O. Butler, Warren Pipe Co., Everett, Mass.

Vice President — Raymond Meader, Whitin Machine Co., Whitinville, Mass.

Treasurer—Arthur Gibby, East Boston, Mass.

Secretary—Ernest F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass.

*Hunt-Spiller Mfg. Co., and Reporter, New England Foundrymen's Association.

Wisconsin Chapter Sponsors Student Loan Fund

PLANS were recently completed by the Wisconsin chapter for the establishing of Student Loan Funds at Marquette and Wisconsin Universities. The chapter is acting on the recommendation which was made by the Student Aid Committee, of which D. C. Zuege, Sivyer Steel Casting Co., is chairman.

The committee agreed that recipients of loans must meet the following qualifications: (1) he must be a Wisconsin resident; (2) he must have not more than three years left in school; (3) he must have an average of least one grade point per credit with no delinquencies, and (4) he must be enrolled in metallurgical work.

The recipients of loans are to be selected by the proper authority at each school and an annual statement shall be forthcoming from said authority regarding the operation of the fund.

The committee also went on to recommend that in order that the benefits developed under this plan may be assessed most completely it is recommended that a permanent Student Aid Committee be created in the chapter; and that the present Student Aid Committee be created as such a committee, to function for a three year period.

The personnel of the Student Aid Committee is as follows: *Chairman*, D. C. Zuege, Sivyer Steel Casting Co.; H. E. Ladwig, Allis-Chalmers Mfg. Co.; F. A. Kartak, Marquette University; Professor E. R. Shorey, University of Wisconsin; and W. J. MacNeill, Federal Malleable Co.

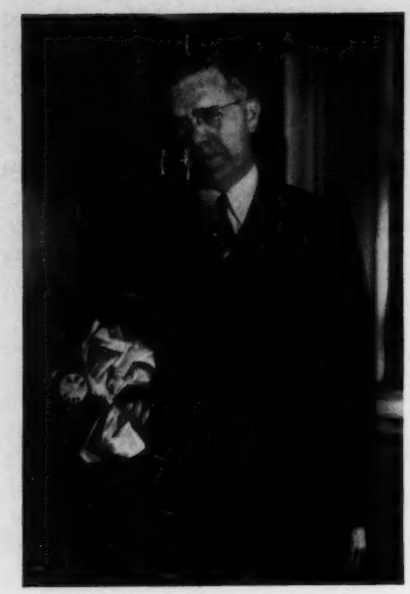
Chesapeake Chapter Holds Get-Together

By L. H. Denton*, Baltimore, Md.

THE Chesapeake Chapter held its first annual "Get-Together Party" on Friday, January 17, at the Lord Baltimore Hotel, Baltimore, Md. Approximately 200 foundrymen from the Chesapeake area attended and thoroughly enjoyed a buffet supper and floor show.

The party, first in the Chesapeake chapter's history, was staged through the combined efforts of an entertainment committee under the chairmanship of L. H. Denton, Baltimore Chamber of Commerce, and Chapter Chairman E. W. Horlebein, Gibson & Kirk Co., Baltimore. The Entertainment Committee, not including Chairman Denton, consisted of the following men: W. D. Bourquin, C. L. Elgert, H. E. George, A. A. Hochrein, R. F. Willey and H. M. Witmyer.

*Secretary-Treasurer, Chesapeake Chapter and Baltimore Chamber of Commerce.



E. W. Horlebein, Chesapeake chapter chairman, recipient of the A.F.A. baby chapter rattle. This award was presented to Mr. Horlebein by I. R. Wagner, Central Indiana chapter chairman, whose chapter was the previous possessor of the trophy.

It was the unanimous opinion of all who attended that the party was an outstanding success and that the next one could not come too soon. During the party, Chairman Horlebein presented to R. T. Covington, chairman of the Membership Committee, the bell used for calling meetings to order, which is the trophy presented to chapters having secured the largest number of members each month during the period of the membership campaign. This bell was won for the second consecutive month by the Chesapeake Chapter for securing the greatest number of members during November and December.

Twin City Foundrymen Discuss Cast Iron

By O. W. Potter,* Minneapolis, Minn.

THE first meeting in 1941 of the Twin City Foundrymen's Association was held January 20 at the St. Anthony Commercial Club, Minneapolis. A buffet supper was served at 6:30 p. m. to 43 members and guests. C. W. Johnson, District Representative, U. S. Department of Labor, gave a brief talk on the apprenticeship program as sponsored by the federal government and the state. He urged the foundrymen to select a committee to look into this matter with the idea of formulating a more definite and uniform plan than now exists. The main speaker of the evening was J. S. Vanick, International Nickel Co., Inc., New York, who talked on the "Engineering Properties of Cast Iron." The lecture was illustrated with lantern slides. A short open discussion followed the lecture.

*University of Minnesota, and Secretary, Twin City Foundrymen's Association.

Dietert Presents Fourth Lecture on Sand at Central New York

By L. D. Wright,* Geneva, N. Y.

HARRY W. DIETERT, president, Harry W. Dietert Co., Detroit, presented the fourth of a series of lectures on "Sand" to the Central New York Chapter at its January 10 meeting at the Onondaga Hotel, Syracuse, N. Y. At this meeting, Mr. Dietert discussed the subject of cores. Of specific interest was a description of the manner in which cylinder block cores are produced in Russia. He stated that the core mix contains 12 per cent moisture and that the cores are subjected to a very low freezing temperature. The vents in the cores are very large and, after pouring, the core will break down in approximately 4 min. Another interesting point is the fact that the iron does not boil when it comes in contact with the frozen core. The iron produced in the casting has a very close structure, part of which is probably due to the chilling effect of the frozen core.

The speaker gave a very comprehensive description of the different types of core binders and gave instructions on the proper way that core sand should be mixed. He stated that, while there was considerable controversy over the mixing procedure, he felt that, for ordinary purposes, the various ingredients should be mixed in the following order: Sand, clay, cereal, and water. This mixture should be mixed to produce maximum green bond and then if the oil is added, the results would be satisfactory.

In discussing recirculation of air in core ovens, he stated that it is possible to recirculate two-thirds of the gases from the ovens adding about one-third fresh air. Most core oils give the maximum results when baked at a temperature near 400°F. Some oils impart a high tensile strength and others a low one when the core is warm. He also discussed core baking.

*U. S. Radiator Corp., and Secretary, Central New York chapter.

The First Annual Frolic of the Chesapeake chapter was a big success as shown in these shots by Frederick Bruggman, Gibson & Kirk Co.

Abstracts

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, N. Y.

Alloy Steels

BRITISH AND AMERICAN. *"Alternative British and American Alloy Steels," The Iron Age,* vol. 146, no. 26, December 26, 1940, pp. 40-41. To aid in work now being done in this country for British interests *The Iron Age* has reproduced two tables which should aid greatly in supplying proper steel parts for export orders. One table shows possible alternative British and American S.A.E. steels, based on chemical composition, and the other table shows the chemical compositions of British and American nickel alloy steels. These steels shown in these tables range through the case hardening, direct hardening, and the corrosion and heat resisting grades of alloy steel. (S.)

Alloys

LEAD, ANTIMONY AND CADMIUM. *"The Constitution of the Lead—Rich Alloys of Lead, Antimony and Cadmium,"* by E. C. Rollason and V. B. Hysel, *The Journal,* Institute of Metals (London), vol. 66, 1940, pp. 349-380. The constitution of alloys of lead with antimony and cadmium has been investigated up to about 15 per cent of antimony and 20 per cent of cadmium. Thermal, electrical-resistivity, and microscopical methods have been used, and the results are shown in vertical and horizontal sections of the constitutional model. Lead and CdSb form a pseudo-binary system with a eutectic at 275°C. containing cadmium 4.32 and antimony 4.68 per cent. Two ternary eutectics occur: (1) at antimony 11.3, cadmium 1.3 per cent, and (2) at cadmium 18.5 and antimony 2.5 per cent. The solid solubility of cadmium and antimony in lead has been determined at various temperatures. The solid solubility on the pseudo-binary section at 275°C. is 2.5 per cent CdSb, while at 25°C. it is less than 0.3 per cent CdSb. The addition of cadmium greatly reduces the solubility of antimony in lead, but antimony has little effect on the solubility of cadmium in lead. (Al.)

NICKEL SILVER. *"The Nickel Silver Alloys,"* by J. O. Hitchcock, *The Metal Industry* (London), vol. 47, no. 20, November 15, 1940, pp. 382-386. This article gives an exhaustive survey of the nickel-copper-zinc group of alloys from the point of view of composition, physical and mechanical properties. The author offers suggestions as to the most suitable compositions for any particular application and also deals with the corrosion resistance and fabrication of these alloys. (Al.)

NICKEL SILVER. *"The Nickel Silver Alloys,"* by J. O. Hitchcock, *The Metal Industry* (London), vol. 47, no. 21, November 22, 1940, pp. 410-412. In this concluding instalment the writer deals with the joining of the nickel silver alloys. The operations of cleaning and machining also are dealt with and the procedure necessary to obtain good castings is outlined. (Al.)

Aluminum Bronze

AIRCRAFT. *"Controlled Aluminum Bronze for Aircraft Parts,"* by George Dreher, *Metal Progress,* vol. 38, no. 6, December, 1940, pp. 789-795. All major aircraft produced in this country are now equipped with several components made of aluminum bronze. Composition, or chemical control of the aluminum, is just as important in copper alloys as is the proper control of carbon in iron alloys. The copper-aluminum equilibrium diagram in the paper gives a clear picture of the structural variations which are possible with minor changes in aluminum content in the vicinity of 10 per cent aluminum. Some remarks about the interpretation of some microstructures are made by the author. Aluminum in aluminum bronze is used to reduce compounds of aluminum and retain metallic purity. Properly designed molds or chills are essential for the desired structure in aluminum bronze castings. Centrifugal casting is used wherever possible for aircraft parts. By pouring in a high speed revolving mold, a pressure of 66 lb. per sq. in. on the molten metal is ordinarily achieved in control to 1.62 lb. per sq. in. in similar sand castings. This enormous increase in pressure aids in eliminating gases and low gravity particles from the parent metal. Further comment is made showing how structural control can be achieved by hot working and heat treatment, or a combination of these processes. The article is concluded by giving a list of six good examples of typical aircraft parts. (Al.)

Cast Iron

MOLYBDENUM. *"Dilatometric Studies in the Transformation of Austenite in a Molybdenum Cast Iron,"* by Donald B. Oakley and Joseph F. Oesterle, *Transactions,* American Society of Metals, vol. 28, no. 4, December, 1940, pp. 832-852. This paper presents the results of an investigation of the transformation of austenite as found in a 0.50 per cent molybdenum cast iron, and on the base iron from which the alloy was made, at seven constant subcritical temperatures. A modified dilatometer was used in this study. The total reaction times of many specimens at each temperature was observed. Metallographic pictures of completed reactions are shown. (C.I.)

PIG IRONS. *"The Metallography of Inclusions in Cast Irons and Pig Irons,"* by A. Morrogh, *The Iron and Steel Institute* (British), advance copy of paper for May, 1941 meeting, 74 illustrations, bibliography, 47 pp. A preliminary scheme of classification for inclusions in cast irons and pig irons has been developed. Using this classification, the various inclusions are dealt with under the appropriate headings. Various experiments have been performed to elucidate the nature and mode of occurrence of these particles. The effect of pouring temperature on the morphology of manganese sulphide is discussed. Both manganese and iron sulphide were found to behave as nuclei for the formation of temper carbon in malleable iron. Manganese sulphide gives "graphite-flake-aggregate" temper carbon and iron sulphide gives spherolitic temper carbon. A blue-pink inclusion has been observed in various cast irons containing titanium and insufficient manganese to neutralize all the sulphur as manganese sulphide. This constituent has been prepared in a number of melts and shown to be probably titanium sulphide. Two forms of the titanium sulphide inclusion occur, one allotriomorphic and iniomorphic. The complicated optical properties of this inclusion, as revealed by the metallurgical polarizing microscope, are described in detail. The effects of test-bar diameter and titanium content on the number of titanium carbide and titanium cyano-nitride crystals have been determined by means of inclusion counts. An attempt was made to determine whether the solubility of titanium carbide in austenite could be detected by the inclusion count method. The effect of zirconium, in amounts up to about 0.5 per cent, on the inclusions in cast irons was studied. With increasing zirconium contents it was found that the manganese sulphide in the base iron was gradually replaced by an orange-yellow to gray inclusion. When all manganese sulphide had been removed from the structure, blue-gray cubes of zirconium carbide appeared, which combined with the titanium carbide present to give a complex titanium-zirconium carbide. The optical properties of the orange-yellow to gray inclusions, as revealed by the polarizing microscope, are given in detail. In melts carried out in a rocking arc furnace, the yield of zirconium from ferro-silicon-zirconium additions was very poor and most of the zirconium appeared to be fixed as lemon-yellow zirconium nitride. An attempt to introduce this inclusion into crucible-melted cast iron by bubbling nitrogen through the melt failed. Very little analogy was found between the inclusions in steels and cast irons, the latter being characterized by the almost complete absence of visible oxides or silicates. In conclusion, it is suggested that the small particles referred to in the paper could be termed "minor phases" to great advantage with regard to definition. (C.I.)

PROPERTIES. *"The Engineering Properties of Gray Cast Iron,"* by F. E. Fisher, *Pig Iron Rough Notes,* no. 82, Autumn, 1940, pp. 11-15. The second part of this article contains a brief summary of additional information on the properties of cast irons that are not ordinarily determined,

or which cannot be expressed in terms of a simple test. It also contains a brief discussion of such properties as machinability and resistance to corrosion and wear, the influence of phosphorus on machinability, and others which cannot be evaluated numerically. (C.I.)

VANADIUM. *"Vanadium in Cast Iron,"* by E. Piwowarsky, *Foundry Trade Journal,* vol. 63, no. 1267, November 28, 1940, pp. 345-346. The author relates what effect the element vanadium has on the equilibrium diagram and what influence it has on the structure of cast iron. The structure of cast iron is sometimes appreciably refined by additions of vanadium, the vanadium-rich carbide tending to the spherical form, unlike lamellar pearlite. Further discussion is presented concerning the influence of vanadium on hardness and strength of cast iron. (C.I.)

Casting

AUTOMOTIVE. *"Production of Automotive Castings,"* by H. S. Austin, *Metal Progress,* vol. 38, no. 6, December, 1940, pp. 775-780. The importance of cast iron in automotive construction is well established; about 12 to 14 per cent of the total weight of the automobile consists of cast iron castings. By far the largest bulk of castings is made of hypo-eutectic iron. This review then tells why cast iron is used in the automotive field by giving its advantages over steel. Among two of its many advantages is included its resistance to wear and an ideal material for use in moving parts. Melting of cast iron in a cupola using coke as a fuel is considered the most common and economical type of cast iron manufacture. The discussion of the cupola as a melting unit is reviewed. Like most other metals and alloys, the physical properties of gray cast iron are greatly affected by the cooling rate during solidification and down through the critical range. What effect this has on cast iron is then discussed by the author. The article is concluded by comments on heat treating and metal control. Metal control referring to the system employed for checking and controlling the raw materials, the melting practice and the composition and physical properties of metal in castings. (C.)

DEFECTS. *"There Are Reasons for Casting Losses . . . If We Find Them!"* by M. L. Carr, *Pig Iron Rough Notes,* no. 82, Autumn, 1940, pp. 23-26. The majority of foundry losses are due to carelessness, errors in judgment or accidents. The author goes on to explain where bad castings were caused by carelessness. One case had to do with salt in a sand heap and its effect on thin-sectioned castings. The second happening due to finding sulphur in the sand, which was due to lumps of sulphur being mixed in with the sand because the car had not been cleaned out properly before loading the sand. (C.)

DIE. *"Re-Designing Die Castings,"* by P. F. Schneider, *Product Engineering,* vol. 11, no. 12, December, 1940, pp. 570-572. There are many general rules for the design of die castings, and the designer is likely to disregard certain of them or to overlook details tending to increase the cost of the die, the casting, or both. The examples explained in this article clarify fundamentals which the designer may well bear in mind—rules are not always apparent when they are only stated as generalizations. All examples shown in this article refer to actual designs of zinc die castings, but the principles involved can be applied to die castings of any other alloys. (C.)

DIE DESIGN. *"Die Mold Design,"* by G. W. Lowe, *The Metal Industry* (London), vol. 47, no. 21, November 22, 1940, pp. 402-404. In this article the author deals with the factors governing the design of dies for the gravity die casting process and by reference to one particular die shows how general die design is applied in practice. (C.)

PROBLEMS. *"Foundation Problems,"* by Ben Hird, *Foundry Trade Journal,* vol. 63, no. 1267, November 28, 1940, pp. 349-351. Three types of castings, chosen from many in which the liberation of occluded gas, from one source or another, has caused trouble, are dealt with, and a brief detailed description of the method of molding is of great interest. From the personal experience of the author and the experiments conducted the conclusions drawn were that gas given off by cast iron in the molten state and during the solidification period, down to a definite temperature, not established; and in the reverse direction, when metal is heated up to a certain temperature, gas is given off. A discussion of the paper proper also is included with this article. (C.)

Centrifugal Casting

NON-FERROUS. *"Centrifugal Casting,"* by J. D. Zaiser, *The Metal Industry* (London), vol. 47, no. 16, October 18, 1940, pp. 302-305. This article tends to let the author give details of the application of centrifugal casting to non-ferrous alloys. There is no doubt that the future will see a much more general use of this process since it offers many advantages, particularly in uniformity of physical properties. Though this article is the general summary of the process, and while all of the procedures outlined are not universal due to the diversity of practice and facilities in various companies employing the process, the picture is outlined to the reader. Spun castings will gain in popularity, and all signs point to a wider use of this process and wide recognition of the place of centrifugal castings in modern industry. (C.)

Furnace Atmospheres

CONTROL. *'The Control of Furnace Atmospheres," Industrial Heating,* vol. 7, no. 12, December, 1940, pp. 1164, 1167. This article covers papers presented at the symposium on furnace atmospheres for metallurgical purposes by the division of gas and fuel chemistry of the American Chemical Society. The present study of the concept of equilibrium and the properties of the equilibrium constant, particularly its significance in relation to the control of conditioned atmospheres in metallurgical furnaces, was limited to the phenomena of decarburization and oxidation as governed by the reactions explained in the article. (F.)

Heat Treatment

LITHIUM. *"Lithium Atmospheres," Steel,* vol. 107, no. 14, September 30, 1940, pp. 52, 54. The Lithium Corp. has perfected a new method for heating steel and nonferrous alloys. It is based on the use of lithium as a neutralizing medium for furnace atmospheres but does not involve any basic changes in heat treating practice. The process claims as its principal merit the fact that the material treated leaves the furnace with the same surface analysis as when placed in it. Meaning that carburization, decarburization and scaling are entirely eliminated. The furnace is described in detail in relation to size and dimensions and also important facts are listed concerning its operation. (F.)

TOOL STEELS. *"Heat Treatment of Tool Steels,"* by John English, *The Iron Age,* vol. 146, no. 26, December 26, 1940, p. 35. This is a simplified list of instructions concerning the heat treatment of tool steels. The importance of heating is stressed in regard to the heating time of tools, how they should be heated and what type of heating is desirable. Instructions also are given on how tool steels can be hardened free from soft skin or decarburized surface by some simple rules concerning furnace atmosphere. (H.T.)

Malleable Cast Iron

HYDROGEN. *"The Significance of Hydrogen in the Metallurgy of Malleable Cast Iron,"* by H. A. Schwartz, G. M. Guiler and M. K. Barnett, *Transactions,* American Society of Metals, vol. 28, no. 4, December, 1940, pp. 811-831. This paper is in the nature of an exploratory survey of the significance of hydrogen content of white iron intended for conversion into malleable cast iron. Until the development of a reasonably easy method for the quantitative determination of hydrogen, opinions on this subject are largely based on qualitative evidence or even on conjecture. Data are given on the range of hydrogen contents to be expected in commercial melting and on its relation to oxygen content. A brief exploration of the solubility of hydrogen in graphitized white cast iron is described and it is shown that in the annealing operation hydrogen is largely eliminated. It is shown that white iron anneals relatively slowly in hydrogen-rich atmosphere and that white cast irons rich in hydrogen initially anneal more slowly than those low in that element. The effect of hydrogen content is quite similar. No mechanism for this impairment has yet suggested itself. Weight for weight, hydrogen appears the most potent element so far investigated in its effects on graphitizing rate. (C.I.)

Melting

ELECTRIC. *"Refractory Life in Electric Arc Melting of Steel and Alloys,"* by J. H. Chivers, *The Bulletin, American Ceramic Society,* vol. 19, no. 11, November, 1940, pp. 442-443. A discussion is presented of (1) the types of refractories used in an electric arc-melting furnace, (2) the furnace construction, (3) the effect of voltage variations and of slag composition, and (4) the furnace shell construction. The effect of voltage variations on lining life is important, and the use of sillimanite rings at the electrode rings at the electrode openings is helpful in some furnaces. (F.)

KIROV METHOD. *"Information About the Kirov Method of Melting High Alloy Steels," Iron and Steel* (London)), vol. 14, no. 4, December, 1940, pp. 134-135. In the Kirov method the steel is melted under a small quantity (½ per cent) of semi-slag in a basic electric-arc furnace. In the present paper special reference is made to the application of the Kirov method to high-alloy, stainless, acid and heat resistant steels. The charge should contain not more than 0.40 per cent of carbon, not more than 0.20 per cent of chromium and not more than 0.50 per cent of sulphur. Immediately after melting the carbon content should be 0.25-0.35 per cent and the manganese content 0.4-0.6 per

cent. During melting 1.5-2 per cent of lime is added to form slag. Oxidation to eliminate phosphorus should be complete in 15-20 minutes. When the carbon has been reduced to 0.10-0.08 per cent the slag is almost completely removed and ore is added to reduce the carbon content to 0.02 per cent. After boiling 40-50 minutes, 75 per cent of the slag is removed. For refining, the bath is treated with aluminum, ferro-silicon, crushed fire clay and manganese. After deoxidation and the formation of a thin fluxing layer, preheated ferro-chrome is added in proportions. The metal is stirred after the ferro-chrome has melted, the slag being treated with 5 per cent ferro-silicon, after which the current is switched off and ferro-titanium is added if required. Finally the current is switched on for 3-4 minutes. The whole refining period lasts 90-95 minutes. The advantages of the process are listed as increased furnace output; reduced energy and electrode consumption; better utilization of the ferro-titanium and prolonged roof life. (Me.)

Steel Melting

PERRIN PROCESS. *"Steelmaking by the Perrin Process,"* by B. Yaneske, *Iron and Steel* (London), vol. 14, no. 4, December, 1940, pp. 125-26. This discussion of the author's paper is evolved around the manner in which the author and his colleagues caused the Tata Iron and Steel Co., India, to plan and construct an entirely new steel works adapted to the carrying out of the process suited for the treatment of Indian iron. The scheme was very carefully planned out and was calculated to produce steel which was quite satisfactory for the purposes in view. Furthermore, it provided a means of producing, by duplexing the slag-treated metal in an acid open-hearth furnace, a steel of open-hearth type, thus enabling the company to avoid the importation of iron suitable for the direct acid open-hearth process. The discussion of the process brought to light such items as the speed of reactions, effect of slag on lining, slag temperature, production of clean steel and many other interesting points in steel production. (Me.)

Temperature

MEASUREMENTS. *"A High-Sensitivity Radiation Pyrometer,"* by N. E. Dobbins, K. W. Gee and W. J. Rees, *The Foundry Trade Journal*, vol. 63, no. 1260, October 10, 1940, pp. 235, 238. A highly sensitive radiation pyrometer would be especially valuable in various works processes in which the accurate control of temperature is desirable. This pyrometer can be adjusted to give maximum sensitivity at any working temperature, and it is reasonable to believe that under such working conditions a variation in temperature of plus or minus one degree C. could be recorded. The constructional details of the instrument are given. Calibration curve was obtained by setting the pyrometer up in front of a surface of which the temperature had been observed by means of an optical pyrometer. Small target area needed to operate this instrument is stressed. (Me.)

February Chapter Meeting Schedule

February 3
Central Indiana
Washington Hotel, Indianapolis
J. A. KAYSER, Laclede-Christy Co.
"Refractories"

✦ ✦

February 5
Metropolitan
Essex House, Newark, N. J.
J. J. CURRAN, Walworth Co.
"Steel Castings"

✦ ✦

February 7
Western New York
Hotel Touraine, Buffalo
VINCENT T. MALCOLM, Director of Research, Chapman Valve Mfg. Co.
"Steel Castings"

✦ ✦

February 10
Chicago
Chicago Towers Club
"Equipment Night"

✦ ✦

February 11
Quad City
Fort Armstrong Hotel, Rock Island
Joint Meeting with A.S.M.
GARNETT PHILLIPS, International Harvester Co.
"Problems in the Application of Cast Iron to Automotive Castings"

✦

Cincinnati
Hotel Metropole
C. O. BURGESS, Union Carbide & Carbon Co.
"Effect of Alloy Additions"

✦

Northern Illinois-Southern Wisconsin
Hotel Faust, Rockford
A. L. ARMANTROUT, Carnegie Illinois Steel Co.
"Apprentice Training"

February 12
Michiana
LaSalle Hotel, South Bend
Joint Meeting
A.S.M. and Association of Commerce
J. H. VAN DEVENTER, The Iron Age
"Today's Challenge to the Engineering Profession"

✦

St. Louis
De Soto Hotel, St. Louis
"Equipment and Supply Night"

✦ ✦

February 13
Northeastern Ohio
Cleveland Club, Cleveland
JAMES S. VANICK, International Nickel Co.
"Engineering Properties of Cast Iron"

✦ ✦

February 14
Philadelphia
Engineers Club, Philadelphia
JOHN N. LUDWIG, JR., Electro Metallurgical Co.
"Ferro Alloys in the Control of Metallurgical Properties of Cast Iron"

✦

Northern California
Lake Merritt Hotel, Oakland
"Sand"

✦

Central New York
Hotel Onondaga, Syracuse
H. H. JUDSON, Goulds Pumps, Inc.
"Gates and Risers"

✦ ✦

February 17
Pittsburgh Foundrymen's Association
Fort Pitt Hotel, Pittsburgh

✦ ✦

February 20
Detroit
Detroit-Leland Hotel, Detroit
HORACE DEANE, American Brake Shoe & Foundry Co.
"Production Methods on Unusual Compositions"

February 28
Ontario
Rock Garden Lodge, Hamilton, Ont.
E. K. SMITH, Electro Metallurgical Co.
"Alloy Additions to Gray Iron, Malleable Iron and Steel Castings"

✦

Chesapeake
Engineers Club, Baltimore

✦ ✦

Special Meeting

February 17
Toledo
Hotel Hillcrest, Toledo
W. G. REICHERT, American Brake Shoe & Foundry Co.
"Foundry Sand Control"

✦ ✦

Chapter Organization

February 3
Muskegon-Grand Rapids
Hotel Occidental, Muskegon
L. P. ROBINSON, Werner G. Smith Co.
"Practical Core Room Problems"

✦ ✦

Regional Meetings

February 20 and 21
Wisconsin Chapter
Fourth Annual Regional Conference
Hotel Schroeder, Milwaukee

✦ ✦

February 27, 28, March 1
Birmingham Chapter
Ninth Annual Foundry Practice Conference
Hotel Tutwiler, Birmingham

✦ ✦

March 28 and 29
New England Foundrymen's Association
Fifth New England Foundry Conference
Massachusetts Institute of Technology, Cambridge, Mass.

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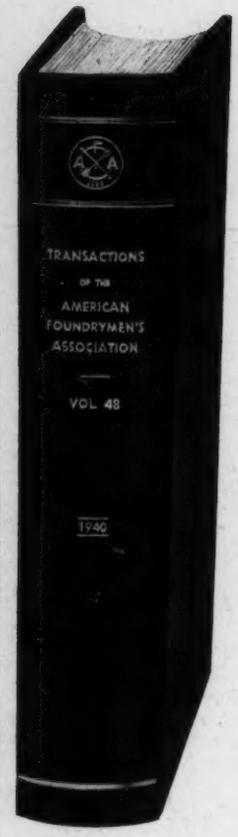

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